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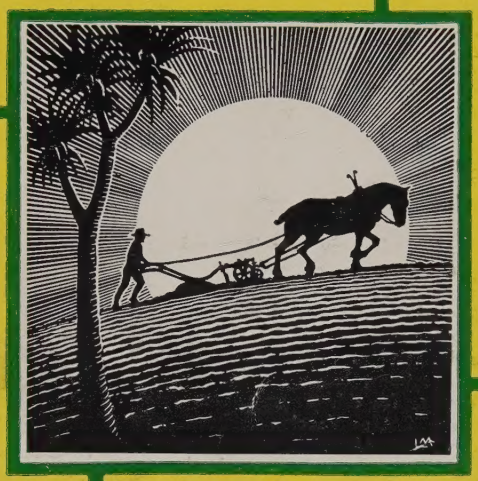

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THE NEW ZEALAND
DEPARTMENT OF AGRICULTURE

Pasture topdressing necessitates a higher standard of general pasture management if the extra feed produced is to be utilised with the minimum of waste. The closing of pastures for haymaking and ensilage is an important feature of good grassland management, and should normally expand side by side with increased topdressing. The figures already given show that the opposite was the case between 1936 and 1938. It thus seems difficult to escape the conclusion that in our dairying districts generally the standard of pasture management is not keeping pace with the wider use of artificial manures, especially in the conservation of surplus spring growth for use in winter.

Summary

By way of a summary, it is interesting to consider the case of North Auckland, which is the only dairying land district where the dairy cow population remained stationary from 1936 to 1938. During the same period, the acreage of grassland topdressed in that district increased from 472,000 to 616,000 acres. On the other hand, the area saved for ensilage fell from 9600 to 6400 acres, and in the case of hay, from 63,000 to 55,000 acres, while the area under special fodder crops declined from 9000 to 6000 acres. The relative position in the larger Auckland land district was practically identical, except that the number of dairy cows showed a small decrease.

At a time such as the present, when every effort is being made to increase the Dominion's production and exportable surplus, it is clear that attention should be paid to the extra provision of feed for stock, especially during the season when the cheapest feed—namely, growing pasture—tends to be in short supply.

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the eleven months, May, 1939, to March, 1940, has been compiled by the Livestock Division :—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat-Export Slaughterhouses—						
Auckland	148,143	587,123	373,920	228,170	1,076,703	254,169
Poverty Bay-Hawke's Bay	38,272	61,402	686,937	299,669	1,375,244	24,279
Taranaki-Manawatu ..	74,946	230,193	481,306	284,601	1,379,234	147,492
Wairarapa-Wellington ..	27,651	18,973	438,742	214,418	975,711	30,020
Totals	289,012	897,691	1,980,905	1,026,858	4,806,892	455,960
Abattoirs	108,498	35,426	434,566	227,806	70,614	107,926
North Island Totals ..	397,510	933,117	2,415,471	1,254,664	4,877,506	563,886
South Island						
Meat-Export Slaughterhouses—						
Nelson-Marlborough ..	772	9,775	31,163	8,743	136,011	8,915
Canterbury	11,011	43,775	329,831	253,885	1,995,202	32,500
Otago-Southland ..	6,040	40,347	213,800	168,185	1,976,195	4,630
Totals	17,823	93,897	574,794	430,813	4,107,408	46,045
Abattoirs	50,419	13,312	248,033	123,868	40,986	25,662
South Island Totals ..	68,242	107,209	822,827	554,681	4,148,394	71,707
Dominion						
Meat-expt. Slaughterhouses	306,835	991,588	2,555,699	1,457,671	8,914,300	502,005
Abattoirs	158,917	48,738	682,599	351,674	111,600	133,588
Grand Totals	465,752	1,040,326	3,238,298	1,809,345	9,025,900	635,593
Same period 1938-39— Meat-export Slaughterhouses and abattoirs ..	455,386	1,003,409	3,551,959	1,856,586	8,868,786	830,629
Same period 1937-38— Meat-export Slaughterhouses and abattoirs ..	449,586	1,052,879	2,733,891	1,379,766	8,841,588	905,347

Slaughterings of Pigs

The 106,823 pigs killed during March were distributed in weight ranges as follows:—

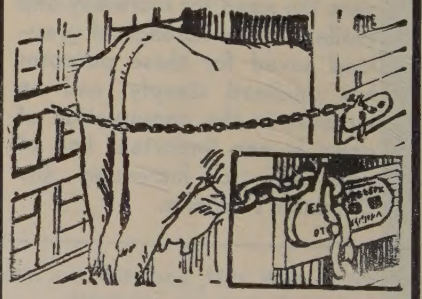
Under 60 lb.	621
61-100 lb.	19,864
101-120 lb.	23,864
121-160 lb.	46,927
161-180 lb.	10,731
Over 180 lb.	4,005
Sundries	811

The grading of pork is 90 per cent. primes and 10 per cent. second quality, and of bacon 74 per cent., 20 per cent. and 6 per cent. of prime 1's, prime 2's, and second quality respectively.

In the different weight ranges of baconers the grading is as follows:—

101-120 lb.	88%, 8%, 4% of P1, P2 and 2nds.
121-160 lb.	71%, 23%, 6% of P1, P2 and 2nds.
161-180 lb.	50%, 37%, 13% of P1, P2 and 2nds.

HAYES' Latest COW LOCK



Our Cow Lock does away with the old style rope, which is not sanitary, and has to be replaced frequently. We supply 6ft. of strong chain, a 7in. wire loop, and staples to attach chain. Also heavy fork and two coach screws to attach fork portion to rail or upright post.

Price complete, 4/11 each.
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Dear Sirs,—I would just like to mention your Cow Lock—it is out on its own. I have seen quite a number of these in cow sheds I have visited.

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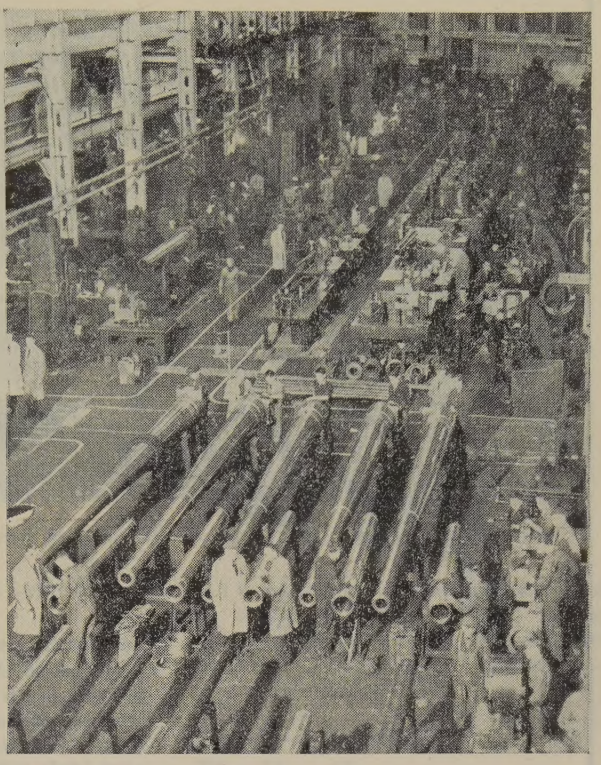
New Zealand's Pastures Are Her War Machines

— By —

J. W. WOODCOCK,
Fields Superintendent,
Dunedin

ALL over the Empire the lathes and drills of industry are turning out shining new machines for the prosecution of the war. Motors and rifles, tanks and massive guns, shells and delicate scientific instruments—all are being produced in abundance. Built with the utmost precision and care, they are destined to play an important part in the struggle ahead; their lives may be short, but their quality must be beyond reproach.



ENGLAND.—"The lathes and drills of industry are turning out new machines for the prosecution of the war."

NEW ZEALAND.—"In terms of war effort, our young pastures share the front rank with new machinery of industrial Britain."

Not only in Britain are these pieces of equipment being fabricated, but Canada has undertaken an important role in their production, and even Australia is contributing some of her industrial skill to the provision of war equipment.

NEW ZEALAND'S CONTRIBUTION

But the war is being fought on many fronts and with many weapons, and New Zealand's contribution, besides sharing the military front, is mainly directed towards food production. Food is to be equally as important as munitions, and not only does this bear out one of Napoleon's epigrams—"An army marches on its stomach"—but it forces us to realise that the civilian population of Great Britain (the home front) has to work, watch, worry and wish for victory largely supported by a diet of imported food. Morale will be higher and work will be better done by a people well supplied with food than by a nation on short rations.

Therefore, while we cannot share in the supply of the more spectacular war material—though to many a plump, well-cooked ham is still more spectacular than a gleaming shell case—New

K.P. Fertilisers for Autumn Topdressing!

AIM

at a higher level of agricultural efficiency—extra Winter and early Spring feed is best encouraged with

K.P. HIGH-GRADE SUPER
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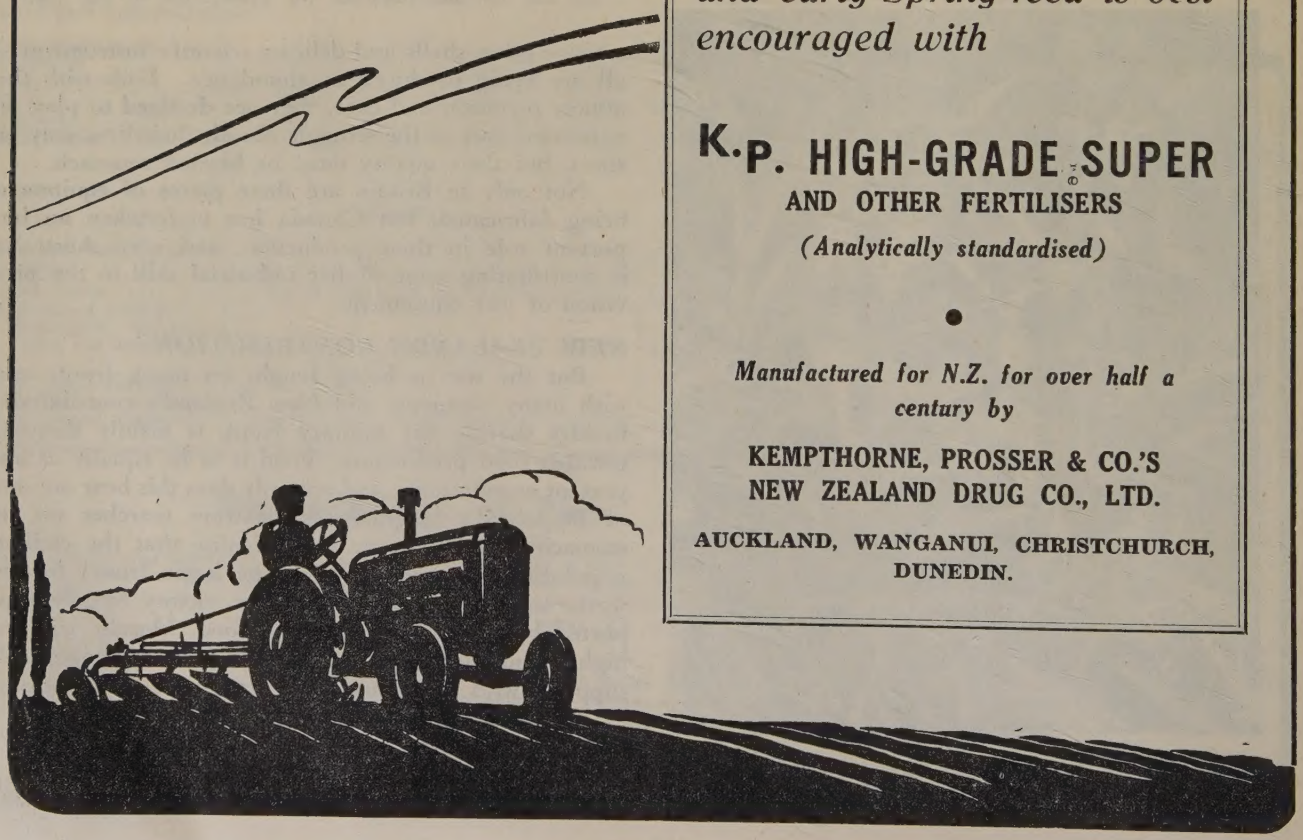

Zealand, because she is not industrially fitted, must supply other useful and necessary material, chiefly meat, butter, cheese and wool. Such is our obligation, and we should approach the task with at least the same determination as those who manufacture the other sinews of war. Our factories are the farms, and our machines are mainly the grasslands which produce the goods we must export.

Let us take stock, therefore, of our machines. Some are highly producing and have served both farmer and State for many years; they have been well established and have been satisfactorily treated throughout their lifetime. Others are working to fair capacity; they are still in first-class order, but their output is not what it should be. There are leakages, not through any fault of the machine, but on the part of the operator; and grass, the product of the first stage of manufacture, is not being fully utilised for the second.

Moreover, we have some decrepit, out-of-date machinery—pastures which are outworn and need renewing; pastures which are low in production and cannot be renewed; pastures which are almost derelict beyond all hope of salvation.

Pastures Are Our Producing Units

But the shining lights in our array of producing units are the young, newly-sown pastures. They are comparable in our survey of the Empire's war resources to the gleaming lathes, turbines, and motors being poured out, brand new, from the factories overseas. They, like their counterparts, have great possibilities. Many years of useful work lie ahead if precision has been adopted in their manufacture, and if they are well used. Their service to the farmer and to the Empire will depend to a large extent on the materials which have been put into them.

"By checking up on raw materials the quality of the product is safeguarded."

This year, if recent trends are maintained, there will be approximately half a million acres of grass being sown to permanent pasture, and now, as never before, we must see that they are of the right type and that their treatment, particularly in the first few months, is good.

The requirements for sowing permanent pastures have been stated often in the pages of this "Journal," and it is necessary only to reiterate briefly the salient points.

A deep, fine, firm seed bed is required. On all but the heaviest soils a roller should be used just before sowing. In districts where lime is considered beneficial, liming before sowing is advisable, while manuring with the seed, particularly a quick-acting phosphatic manure such as superphosphate, is essential on nearly all soils.

The seed to be sown should be of good germination and purity. The correct strain of species is important, and in most cases certified seeds should be employed. The mixture to be used should suit the soil type and the particular purpose for which the pasture is intended.

How To Reduce The Hazards

Having accomplished thoroughly the preliminary work and the sowing, the elements over which the farmer has no control play their part. This is where our analogy with the machine or the factory breaks down. The manufacturer works under fairly controlled conditions, while the farmer is at all times subject to certain hazards. But apart from still being at the mercy of the weather and uncontrollable disease, luck or chance can largely be elminated from farming operations.

KNOW THE SEED WHICH IS SOWN! Its germination can be assured; its origin can be certified. Buyers of "cheap" seed mixtures of unknown origin and purity increase the hazards of farming.

MAKE SURE OF THE FERTILISERS APPLIED! While the components of any fertiliser can be checked by reference to the analyses shown on every sales invoice, this does not guarantee that mixtures are economical or desirable. It is in this way, by checking up on the quality of his raw materials, that the manufacturer assures himself of the strength of his product.

We have repeatedly likened pastures to machines, and just as a new machine requires to be "run in" for the first few months, so

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does a young pasture require careful handling during the same period.

To make really sure of a good permanent pasture, a topdressing with a phosphatic fertiliser should be carried out about six months after sowing. To some this may seem very liberal treatment. Naturally, the cost has to be considered, and if about 12s per acre is to be added to the cost of establishment by a topdressing six months after sowing it means a fairly large total outlay, what with costs of cultivation, seed, and manure.

But whether farmers make a practice of topdressing regularly, or every two or three years, or only once every several years, they can be assured that the most valuable time to topdress is about six months after sowing, especially if the soil tends to be naturally infertile. It is thus that the pumice lands of Central Auckland, the gum lands of North Auckland, and the tussock lands of Southland are being successfully clothed in first-class pasture. Given a good "strike," the phosphates promote a strong white clover growth; the clover encourages the grasses, and within a year a complete turf is formed.

Care in First Few Months

In the first few months of a pasture's life grazing should be carried out carefully. Hard grazing discourages root development, while lax grazing, which allows the grasses to go to seed, or haying, which tends to smother out the young clovers, should be avoided. The object should be to keep the pasture in a vigorous growing condition and, in fact, to pay as much attention to the well-being of a young pasture as is given to a sheep or a cow or a horse in their early years.

Because it has infancy and adolescence and is subject to disease, drought, and flood, a pasture may be dissimilar to the machine. Its calm, green appearance is certainly not reminiscent of the heat, noise, and bustle of the munitions factory. Yet its very greenness serves to camouflage the industry going on within, where immense chemical processes are taking place day and night without the usual acrid fumes associated with chemical industry.

Clovers and their allied bacteria work constantly to form the free nitrogen of the atmosphere into complex food materials; the green leaf blades of grasses use the carbon and oxygen of the atmosphere to manufacture sugars, starches, and oils; the roots search the soil for its minerals and draw moisture from the reservoir below.

If man could make machinery half so efficient in performing these chemical wonders no blockade could possibly be effective; neither would the German need to conserve his potato parings nor clothe himself in "ersatz" wool and his sausages in "ersatz" casings.

For the production of protein fat and fibre pastures are still supreme, and they are the chief machines for the production of the 600,000 tons of war material—wool, meat, butter, and cheese—which we export to Great Britain.

LET US, THEREFORE, LOOK AFTER OUR MACHINES, ESPECIALLY THE NEW MACHINES.

We are the original designers and first to introduce the "Giant" Disc.

"EVONA" GIANT DISC and GIANT CHAIN HARROW

From rough country to a seed bed

● WRITE for more particulars that will interest you, including names of those who are using similar discs with wonderful results. No obligation at all.

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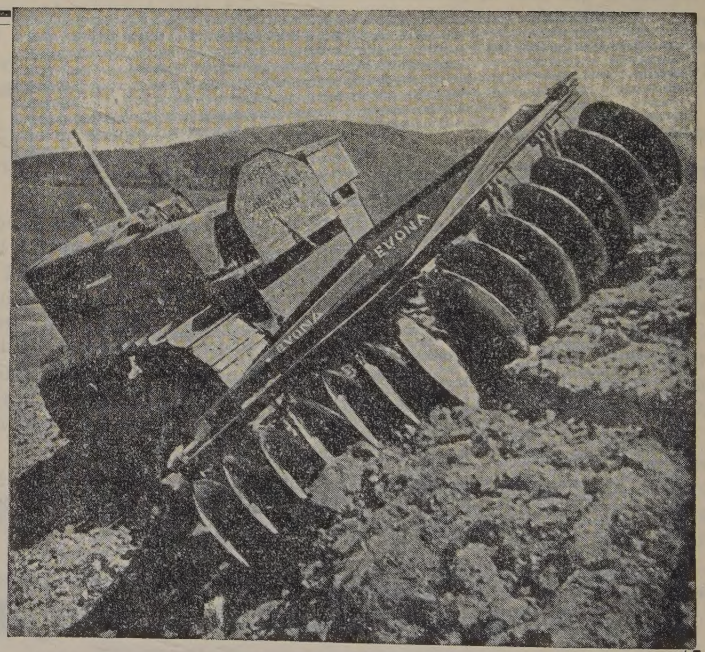
EVONA IMPLEMENT WORKS, AUCKLAND, C.1, SOLE MAKERS.



This photograph shows the "Giant" Disc at work on steep hillsides. It has brought in hundreds of acres of virgin land of all classes for its many users. The "Evona Giant" Disc has also proved remarkably effective on blackberry, scrub, ti-tree, tall-fescue, rank paspalum, fern, etc., doing up to 10 acres double cut virgin land in an 8-hour day. The "Evona Giant Chain" Harrow will clean up all rubbish, pull out loose timber, pull down any mounds, and fill up hollows. Work the two implements and you will have virgin land brought into a seed bed of fine even tilth. **Note the deep cut when set is applied.**

Design and Construction Of Sheep Dipping Baths

Methods and Costs Of Building Various Types

— By —
J. E. DUNCAN,
Wool Instructor, Wellington.

Continued from the April issue, this is the fourth and last of the series of articles on sheep dips. It is hoped to publish these articles shortly in bulletin form so that the information may be readily available to farmers.

Method of Entry to Bath

Anyone who has dipped sheep knows that the older sheep, which have been through the bath before, remember it and have the greatest objection to going near it again. Countless schemes

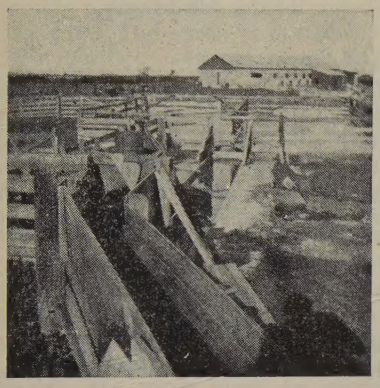


Fig. 6.—An inclined entry-race. Note that this race also has a sharp bend in it, and that there is also a sack hung at the entrance to the downward slide so that the sheep cannot see the dip before they get into it.

have been devised for outwitting the sheep to get them into the bath with the minimum of labour. Hog-back races, curved races, chutes direct from woolshed to bath, crush pens and gate systems of all sorts, and even revolving turn-tables have been tried (see Figs. 6 to 11) for getting these older sheep into the bath with a minimum of difficulty. Most of them work well the first year at least, when the sheep are new to the scheme, but it seems that the device has yet to be found which will outwit the sheep year after year.

Three Systems

Three systems of getting sheep into the bath are shown in Figs. 8, 9, and 10 which at least have the merit of reducing the amount of labour required to move stubborn sheep. Fig. 8 shows the simplest of these, which is simply a circular pen, which may be anything

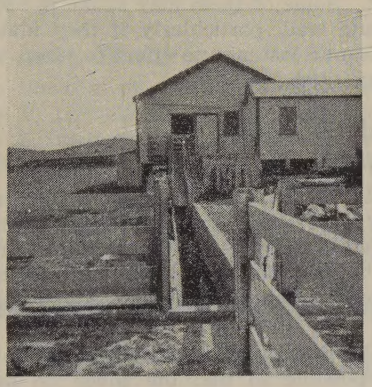


Fig. 7.—Direct entry from woolshed to dip.

from 12 to 16 ft. in diameter and has a central pivot (for example, a 4-inch galvanised pipe set in concrete) on which three gates are hung.

These gates are hung by means of steel straps which encircle the pipe so that they can each move independently and in a complete circle round the central pivot. Each gate is also fitted with a bolt by which it can be locked to the outer wall in certain positions. This outer wall can be of concrete, wood steamed and bent to shape, or heavy-gauge flat galvanised iron bent to shape and attached to a wooden frame; but, whatever method is used, the inside of the walls must be as smooth as possible.

Working Described

The working of this arrangement is as follows:—Referring to Fig. 8, assume that the gates are bolted in the positions shown and that pens B and C are already filled with sheep and that pen A is in process of being filled. Gate No. 3 is now swung round in the direction of the arrow towards gate No. 1, which is still fixed. This decreases the size of pen C, and the sheep are forced on to the platform of the dip through the small lift-gate. When C has been completely emptied gate No. 1 is released and No. 3 is bolted in its place. Gate No. 2 is then swung round in the direction of the arrow, and pen B is emptied of its sheep in a similar way, while by this time pen A will have been completely filled and gate No. 1 will have been swung round to the position previously occupied by No. 2. This means that the sheep which were originally in pen A will now be in the position of pen B in the plan. In this way the process is a continuous one in which

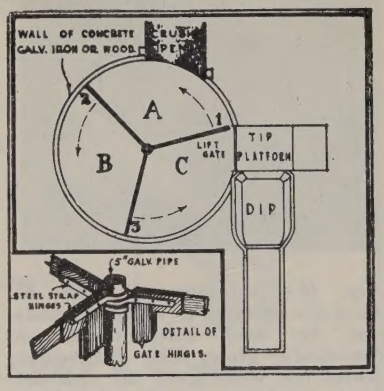


Fig. 8.—Circular crush pen for feeding sheep forward to the dip.

Fig. 9.—A turntable for getting sheep into the dip.

there is always one full pen (which helps to act as a decoy pen), one pen being emptied, and one in process of filling.

Idea Elaborated

A more elaborate modification of this idea is shown in Fig. 9, where the "gates" (now four in number) are a fixture, in the form of hurdles, and the floor of the pen itself is made to move in the form of a turntable. This means that once the sheep are on the floor of the turntable they can no longer resist and are carried forward towards the dip. In this layout one pen is always being filled, one is full (and acts as a decoy), one is being emptied into the dip, and the fourth is always empty.

A further improvement on the same idea is shown in Fig. 10, where again we have a turntable which works just as in the previous case, but this time the four gates are made so that they can either move *with* the turntable or *independently* of it, swinging on the central pivot. This has the advantage that for actually getting sheep into the dip one gate can be pulled round behind them like a sweep, while the other is fixed, so that this design combines the advantages of both Figs. 8 and 9.

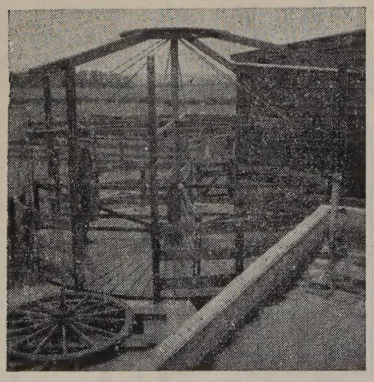


Fig. 10.—An improved form of turntable entrance in which the gates can be used independently as "sweeps." Note: The old wagon wheel has nothing to do with the working of the turntable, but is to keep stock and children from falling into the dip.

A Bad Entrance Causes Losses

Some methods of getting the sheep into the bath are anything but good for them. They may be tumbled in gasping in a heap, and the lower ones bruised and submerged. It is little wonder that there are losses from mechanical pneumonia when this treatment is meted out. The tip-platform is one of the worst offenders when it is badly designed, such as when it is too high above the level of the wash and where the distance from the opposite wall of the bath is too small. Here sheep can fall in all ways, including head first and upside down as often as not. Some of them may strike the opposite wall, particularly if they make a frantic last-minute effort to jump, as they often do.

Safe Working Of Tip-platform

As the tip-platform bath is becoming increasingly popular because of the small number of men required to work it, it will be as well to set out the essential requirements of this design for safe working. They are:—

(a) The platform should be as low as possible so that the sheep do not receive a high drop into the dip.

(b) The design should be such that there is no danger of the sheep striking the far side of the bath, particularly when this is partially empty.

(c) The sheep should not be suddenly tipped in "all in a heap"—that is, the tipping mechanism must be under complete manual control.

(d) The tipping portion should be nicely balanced and not require much effort to operate.

(e) The platform should not hold too many sheep at once.

A study of Figs. 23 to 25 on pages 339 to 341 will show that these ideals have all been achieved in the design.

Fig. 11.—A dip with two alternative entrances—a side-delivery on the right, and a slide straight in front. Note the chaff bags to prevent sheep entering from the side-delivery from bruising themselves on the opposite wall. This is one of the weak points of the side-delivery.

Ideals Achieved

(a) The tip-platform is as close as practicable to the wash in the bath; in fact, when this is full the front edge of the platform actually goes below the liquid when tipped. This also has the advantage of keeping it wet and slippery.

(b) The swinging "apron" in front of the platform ensures that the sheep go into the wash in orderly fashion and do not, as in some dips, make desperate last-minute efforts to jump out of the bath altogether, often injuring themselves in the process. As will be explained later, the apron is locked in position until the handle is actually tipped, so that the sheep cannot fall into the bath prematurely. The reason for the rectangular shape of the bath is twofold. In the first place, it en-

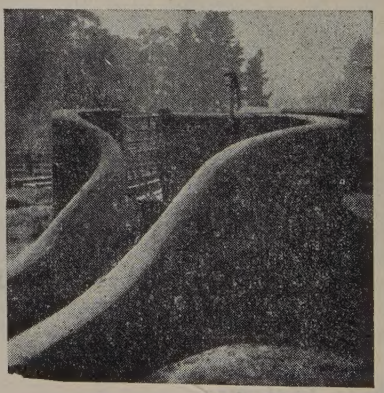


Fig. 12.—This side-delivery is better designed, and has plenty of width opposite the entrance; also a high wall to confine the splash.

sures that there is no likelihood of the sheep striking the side of the bath, even when it is half empty, because they are tipped in from one **end** of the bath, which allows ample room. Secondly, a rectangular bath (with the extreme corners removed as shown in the diagram) is much easier for a farmer to build himself than a circular bath, and is just as effective in other ways.

(c) It will be noticed from Fig. 25 of the tipping portion of the dip that the platform G is mounted on an axis **E, for which ¾-inch or 1-inch galvanised** pipe is very suitable. The back portion of the pen F is connected by means of the two 3-inch uprights to the overhead main beams of the handle, these uprights being jointed at their ends by means of strong bolts, or preferably pipes, to the other members at A and D. The apron H is suspended from the two overhead beams, and is free to swing from the axis C. The main beams of the handle are supported by the axis B, which passes through them. The position of the main axis E on which the platform tips should be noted; it is nearer the front of the platform, being 18 inches from the front edge and 24 inches from the rear edge of the platform. This means that more weight falls behind the axis than in front of it, and there is thus no tendency for the platform to tip itself. On the other hand, by virtue of the long tipping handle by which the platform is controlled, the man working it has a big leverage and can work this platform very easily and can control it to a nicety.

(d) This enables him to tip the platform *gradually* and let the sheep slide gently into the bath without the knocking about which they inevitably receive in designs where the platform is tripped and drops with a sudden jolt.

(e) As the platform is so easy to work, effort is reduced to a minimum, and at a pinch one man can work the whole of the dip. Preferably, however, he requires an assistant for keeping up the supply of sheep while he attends to the tipping, works the crutch, and looks after the exit gate.

(f) The platform shown is designed to hold five or six full-grown sheep.

It will thus be seen that in this design all the requirements set out above have been met. Further constructional details of this particular dip will be found on pages 339 to 341 and 346.

Side-delivery Entrance

In most bath layouts is included a decoy pen with a netting front in which two or three sheep can be enclosed, where they are in full view of the other sheep with the object of luring them on towards the bath. The extent to which they succeed in doing this is questionable, particularly in the case of the older sheep. One type of entrance—popularly known as the "slip-in" or "side-delivery"—is a smooth plate, either of wood or metal, which slopes steeply down into the bath, and the decoy pen is placed just beyond it. (See Figs. 11 and 12.)

Its method of operation is that the sheep try to get across to the decoy pen (although in practice they generally require considerable persuasion), and in doing so slip sideways down the plate (which will be wet) into the bath. This method has the objection that the sheep are always liable to be bruised in their sudden fall, and may even strike the opposite side where the bath is not made sufficiently wide at this point. (See Fig. 11.)

Put in by Hand

In the case of many baths—the pot type in particular—the sheep are run into a small pen at one side of the bath, and are then put in one by one by hand. This is rather a laborious process, but if done properly will not harm the sheep. The sheep are usually "legged" into the bath by a hind leg, and where this is done care has to be exercised not to twist the stifle. They should not be thrown in roughly or head first.

On going into the dip the sheep usually gives an involuntary gasp, and if it goes in head first it is much more likely to swallow some of the wash than when slid in rump first, which is the correct way.

The "Walk-in"

The fourth common method of entry is that usually referred to as the "walk-in." It is really applicable only to the swim-through type of dip. When this method was first introduced it was claimed that it eliminated all the labour of dipping sheep, and that they would eagerly swim through one after the other on the follow-the-leader principle. In practice, it is actually one of the easiest modes of entry to use, but even so, old ewes show a decided reluctance to follow the leader. Details of the "walk-in" entrance are given in Fig. 16, and a detailed description of its working is given on page 336.

It seems to the writer that the merit of the "walk-in" entrance lies not so much in its ease of working—for, after all, a pot bath with a tip-platform can be worked with fewer men—but rather in the fact that the sheep get less rough handling with this type than any other. Their mode of entry to the wash is as natural as possible; they walk down a slope and then start to swim.

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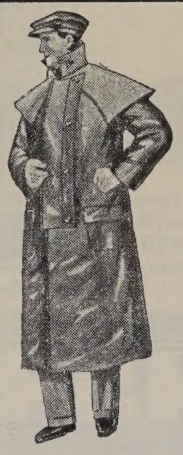
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Importance of a Good Sump

It is necessary to have some arrangement to strain the wash returning from the draining pens to the bath; otherwise a great deal of dirt of one kind and another would find its way back and unnecessarily foul the wash. The fluid from the draining pens is carried by gutters to a sump, or sometimes twin sumps, where it is strained from gross impurities and then returned to the bath.

Various types of sumps have been devised by farmers—all with the same object—but the one which gives the best results and which can be used with any type of wash or dipping bath is shown in Fig. 23. It is fitted with a removable perforated tray, which catches all the gross impurities before the liquid is returned to the dip. This tray, which has 3-16th to ¼ inch holes, should be removed and emptied at intervals before it becomes too foul.

Where one of the soluble fluid dips is being used, any other fine sediment is allowed to settle to the bottom of the sump (the outlet is at the top). and this should also be shovelled out occasionally.

A Paradox

Where, however, one of the powder dips is being used, it is necessary to be able to stir and agitate the contents of the sump from time to time, and the design allows this to be done quite readily without the removal of the tray, as there is plenty of room to get a plunger into the sump.

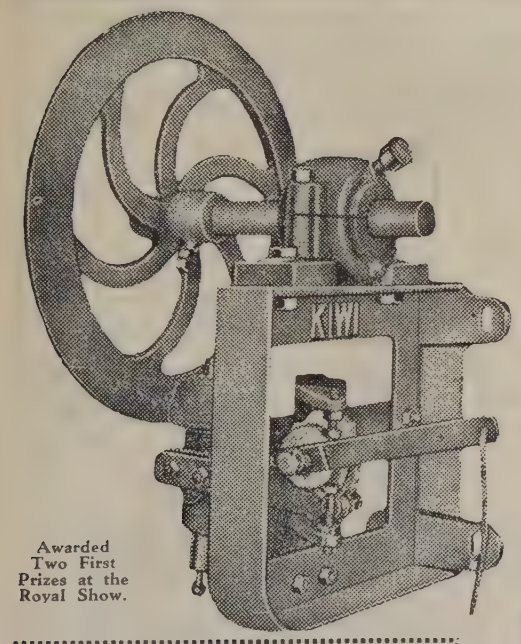
The idea of stirring up the contents of the sump may appear, on first thought, to be strange, but a little reflection will show that if this is not done a good deal of the active powder particles of the dip will settle out in the sump, rendering the wash progressively weaker and less effective. Of course, even with a powder dip it is necessary to empty the perforated tray of gross impurities, such as sheep dung, bits of wool and vegetable matter, etc., from time to time.

It will also be noticed that the outlet from the sump is carried away by way of an open gutter or pipe back to the dip proper, and does not discharge into the exit race. This latter arrangement, quite frequently seen, is a bad one, as it tends to frighten the sheep, and they get deluged with the dirtiest portion of the fluid just as they are leaving the bath. There is also provided, of course, an alternative outlet from the sump at a higher level which is normally plugged up, but when the dip is not in use this outlet is opened to allow rain water to escape, the plug being transferred to the ordinary outlet to prevent this extra water from flowing into the dip.

The Draining Pens

The necessity for and function of these pens is quite obvious, as without them a great deal of dip would be wasted without doing any good. The exit from the bath communicates directly with the draining pens by means of a two-way gate, which may be fastened in either position. If the exit allows sheep to come up two abreast the gate must be wide enough to let them past in this position.

The essential part of the draining pens is the floor, which must be water-



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tight with a gentle slope so that all the fluid runs to the gutters and then into the sump or sumps. By far the most usual and satisfactory material for the floor is concrete, preferably reinforced and roughened to provide a non-slip surface.

In some cases, where concrete and brick or masonry are out of the question, heavy wooden slabs, well tarred and sanded to make them watertight, are used. Another way out of the difficulty is to have a wooden grating floor (woolshed style) and beneath this sheets of corrugated iron which slope down to gutters which carry away the fluid—that is, the whole arrangement beneath the battens is similar to a roof with a very slight rise; only it is dip instead of rain which runs off the "roof."

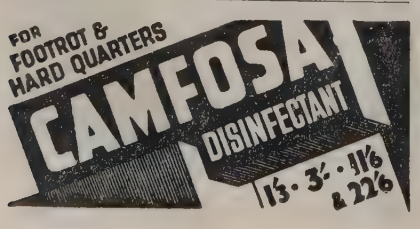
Shape and Size

The fences round the pens, usually post and rail, need no description. There are gates at the other end of the pens, usually narrow ones, through which the sheep are counted out into the yard.

The shape of the draining pens is not very important, although they are usually rectangular rather than square, but they should be of sufficient size to allow the sheep in one pen to have practically stopped dripping by the time the second pen is filled up. This will be accomplished if each pen holds from 75 to 100 sheep. The necessary size can readily be calculated by allowing four square feet of area for each sheep; for example, a pen measuring 10 ft. by 30 ft., or one measuring 15 ft. by 20 ft., will each hold 75 sheep, as they each have an area of 300 square feet.

Examples of Typical Dips

It is proposed in this final section to give several plans of the various types of dips in common use in this country so that the farmers proposing to build will have some guidance as to dimensions, quantities of material required, and capacities of the various dipping-baths. All the plans given are based on actual dips in regular use, so that they can be taken as practical and not mere untried theories. In one or two instances certain alternatives have been recommended, and here again these are based on the results of experience with the various components.



Long Swim Dips

Plans of this dip are given in Figs. 13 and 14 on page 337. From these the main dimensions should be clear. The capacity of the 60 ft. dip shown is approximately 1,700 gallons filled ready for use—that is, to within 6 inches of the brim—but should anyone require a larger or smaller capacity for the same type of dip he can easily work it out as follows:—

The entrance and exit portions of the dip must remain the same in size and shape whatever the length of the dip; therefore, any alteration in capacity must be made by lengthening or shortening the middle portion. In the dip shown this section has a length of 35 ft. and a capacity of 1,333 gallons (at working depth of 4 ft. 6 in.), so that for each foot of length it must hold 38.1 gallons. By using this figure, the capacity of any other length of dip can be easily calculated.

In Figs. 15 and 16 are shown two different types of entrance to the dip. The first one is very similar to that shown in the photograph on page 331 (Fig. 6). The single-width race is offset to one side, and this portion also rises steeply. The idea is that the sheep cannot see where those in front have gone until they are practically in the dip, and sheep always tend to travel better up a slope.

Fig. 16 illustrates the well-known type of "walk-in" entrance frequently used with this type of dip, which is perfectly straight-forward in construction. Referring to Fig. 16, the explanation of its working is as follows:—

A and B are supply and crush pens, which are fed from the usual sheep yards, with which the former should be connected. The latter should have a battened floor, the battens being made in sections so that they can be removed after dipping.

C is the race, 9ft long and 16 inches wide, and sufficient to hold four sheep. This race should have a battened floor, to be removed after dipping.

D represents the "walk-in" section, and is an incline 9 or 10 ft. long (10 ft. is better), gradient 1 in 2, ending in a drop 12 inches above the bottom of the bath. Its width at the point at which it connects with the race is the same as that of the race itself, namely, 16 inches; thence it gradually widens to 24 inches to connect with the bath at the other end, of which it practically forms a part. The sides of the "walk-in" section are also, in all respects, identical with those of the bath.

E represents a portion of the swim bath. a b c represent gates; a and b are 4 to 4½ ft. gates, hung on posts, 3 ft. or 2½ ft. from the side fence, so that when open they will close up the angles and form a "lead in." c is a small gate to close the four sheep in the race.

The method of working the "walk-in" plan is as follows:—After the feeding and crush pens are charged with sheep, four should be run into the race and the little gate (c) closed behind them. The first sheep should be forced forward down the slope until it is up to its knees in the dipping liquid. The next is then quickly moved up, and, on going forward with a rush, will push on the first, so that it starts swimming.

(*Continued on page* 338).

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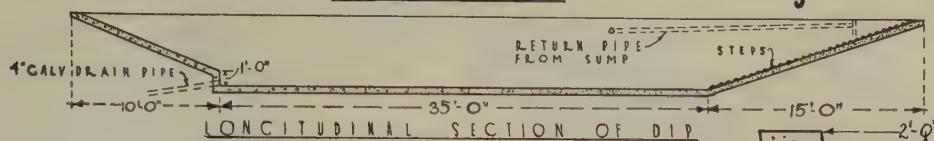
60 FT. SWIM THROUGH DIP FOR LARGE FLOCKS

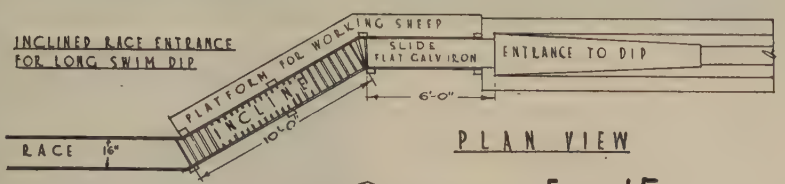
CAPACITY APPROX. 1700 GALLONS

PLAN OF DIP

Fig. 13



LONGITUDINAL SECTION OF DIP



PLAN VIEW

Fig. 15

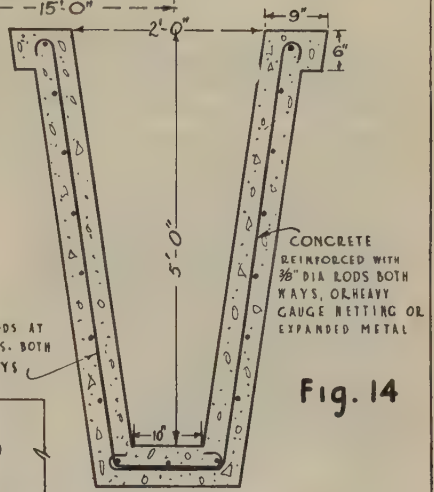
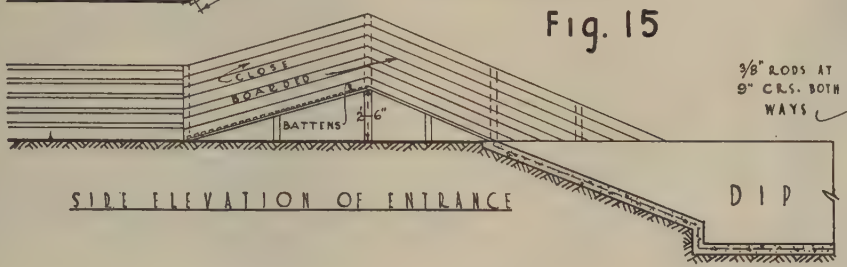


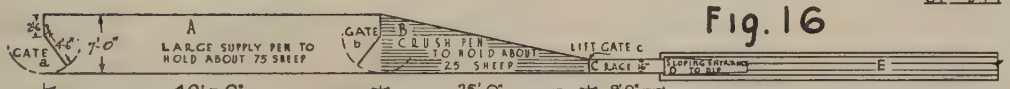
Fig. 14



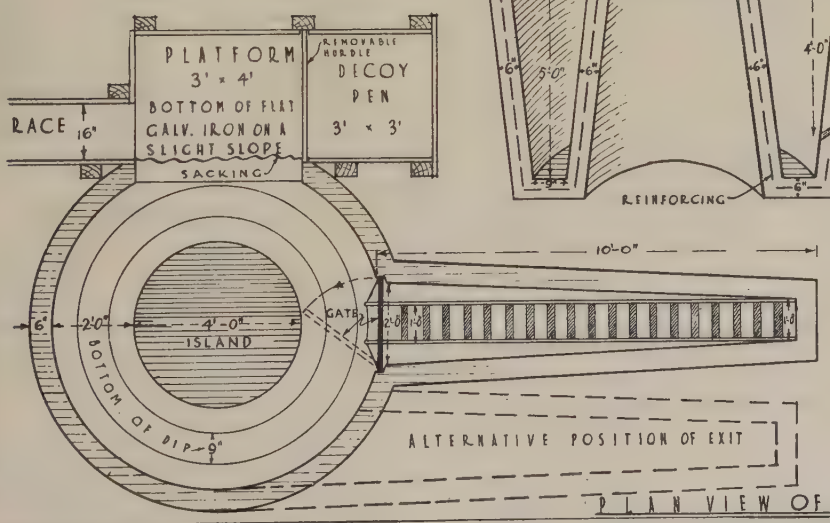
SIDE ELEVATION OF ENTRANCE

CROSS SECTION OF DIP

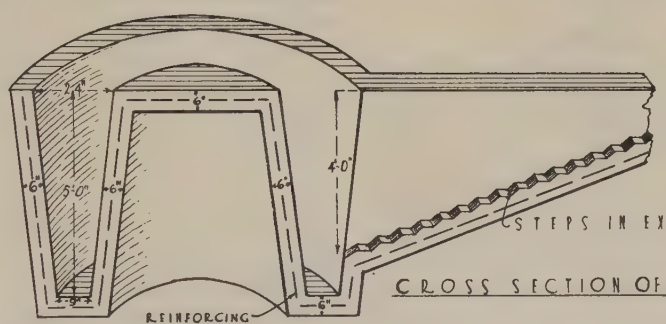
Fig. 16



— ALTERNATIVE TYPE OF ENTRANCE FOR THE ABOVE DIP — THE "WALK IN" —



PLAN VIEW OF DIP

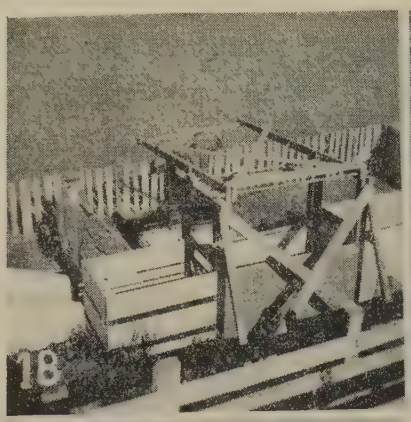


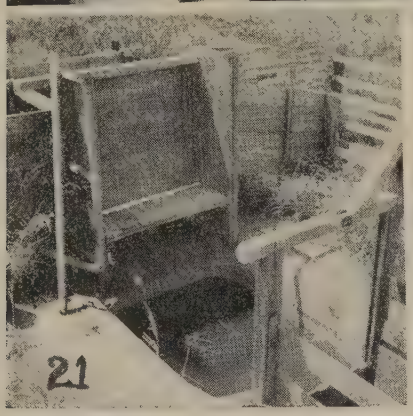
CROSS SECTION OF DIP

Fig. 17

ISLAND OR RING DIP

FOR MEDIUM SIZED FLOCKS
CAPACITY APPROX. 800 GALS. AT WORKING LEVEL (i.e. 6" FROM TOP)





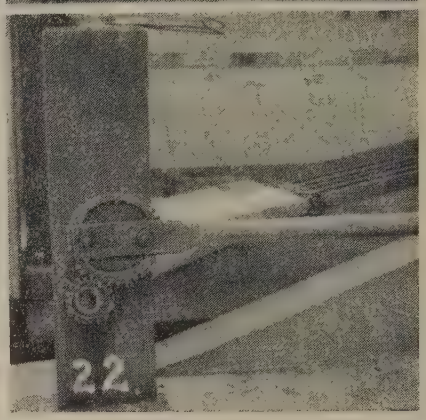


Fig. 18.—A general view of the balanced tip-platform.

Fig. 19.—The platform partly tipped. Note the construction of the geared exit gate from the dip which is fully open.

Fig. 20.—The platform fully tipped and the swinging "apron" open.

Fig. 21.—A good shape of dip to use with the platform shown in the previous illustrations. Note: In the particular dip shown here the platform is too high above the level of the liquid.

Fig. 22.—A close-up of the mechanism to work the gate.

The third and fourth sheep should then be quickly moved up, and at the same time the little gate (c) should be opened and the sheep kept moving forward through the bath in an uninterrupted stream.

Materials Required

For the dip illustrated, 315 cubic feet (approximately 11½ cubic yards) of concrete will be required for the bath itself. Assuming that strong concrete —such as 1 : 2 : 4 mix (that is, 1 part of cement, 2 parts sand and 4 of gravel or broken stone) is used—the following will be the approximate quantities required :—50 bags cement; 135 cu. ft. of sand : and 275 cu. ft. of gravel. It is false economy to use a "lean" concrete for sheep dips, which may be subject to considerable strain through earth movements.

Sometimes, to make a watertight job the inside requires plastering, and this will require anything from 12 to 25 cu. ft. of sand and 6 to 13 bags of cement according to the thickness of the coat applied. Quantities of reinforcing iron are given in Table III. on page 345. The amount of timber, etc., required for the race is so variable that quantities cannot be given.

Details of draining-pens are not given in any of the plans because of lack of space, but their general construction and dimensions have already been dealt with (see page 336), and the same type can be used with any kind of dip. The floor should be reinforced with ⅜-in. steel rods on 9-in. centres each way. Plans for a good type of sump are included in Fig. 23, and here again this one general type can be successfully used with all kinds of dips.

Assuming that the draining pens have a total floor area of 600 sq. ft. and that this floor is 4 inches thick, 200 cu. ft. or approximately 7½ cu. yds. of concrete will be required for building them. Using the same mix as for the dip, approximately 33 bags of cement : 88 cu. ft. of sand : and 178 cu. ft. of gravel will be required. These quantities err slightly on the safe side, so that this amount should be sufficient for the sump as well. Therefore, the total quantity of concrete required will be in the vicinity of 515 cu. ft. or 19½ cu. yards for dip, sump, and draining pens. This concrete will need about 83 bags of cement : 223 cu. ft. of sand : and 453 cu. ft. of gravel.

Island or Ring Dip

This type is illustrated in the photograph on page 254 (Fig. 4) in the April issue and by the plans in Fig. 17. From these plans all dimensions should be clear.

Materials Required

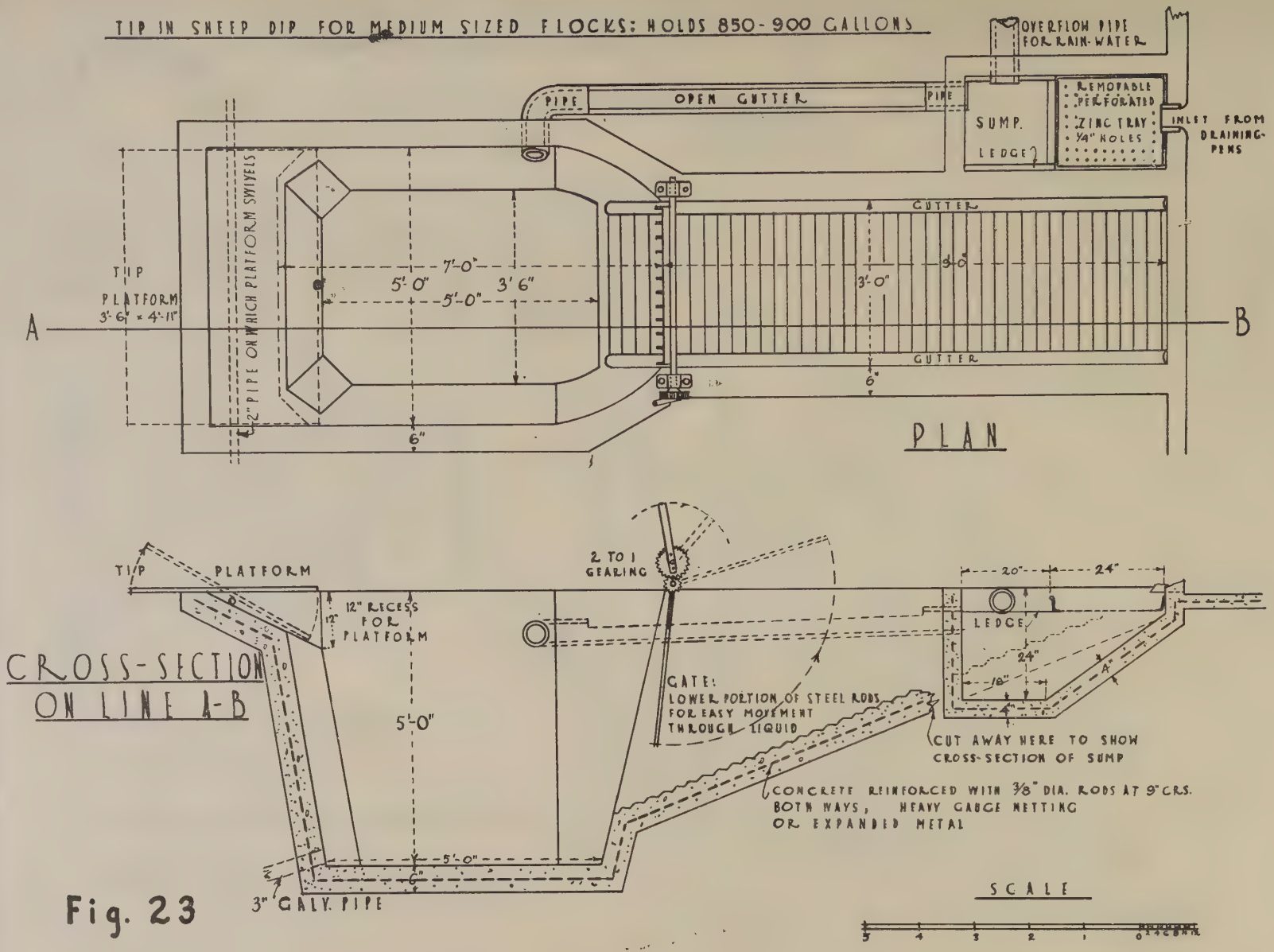
For the dip, 151 cu. ft. (5.6 cu. yds.) of concrete are required, which needs 25 bags cement, 67 cu. ft. sand, and 135 cu. ft. gravel. Quantities for draining pens will be the same as those mentioned above Allow approximately 15 cu. ft. of sand and 7 bags of cement for plastering in addition to the above if plastering is necessary.

Tip Platform Dip

The bath and platform illustrated in Figs. 23-25 is based on two other dips. The platform is of the balanced type illustrated in the photographs (Figs. 18-20), while the bath itself is the type illustrated in Fig. 21. These two units have been found to work very well together in practice.

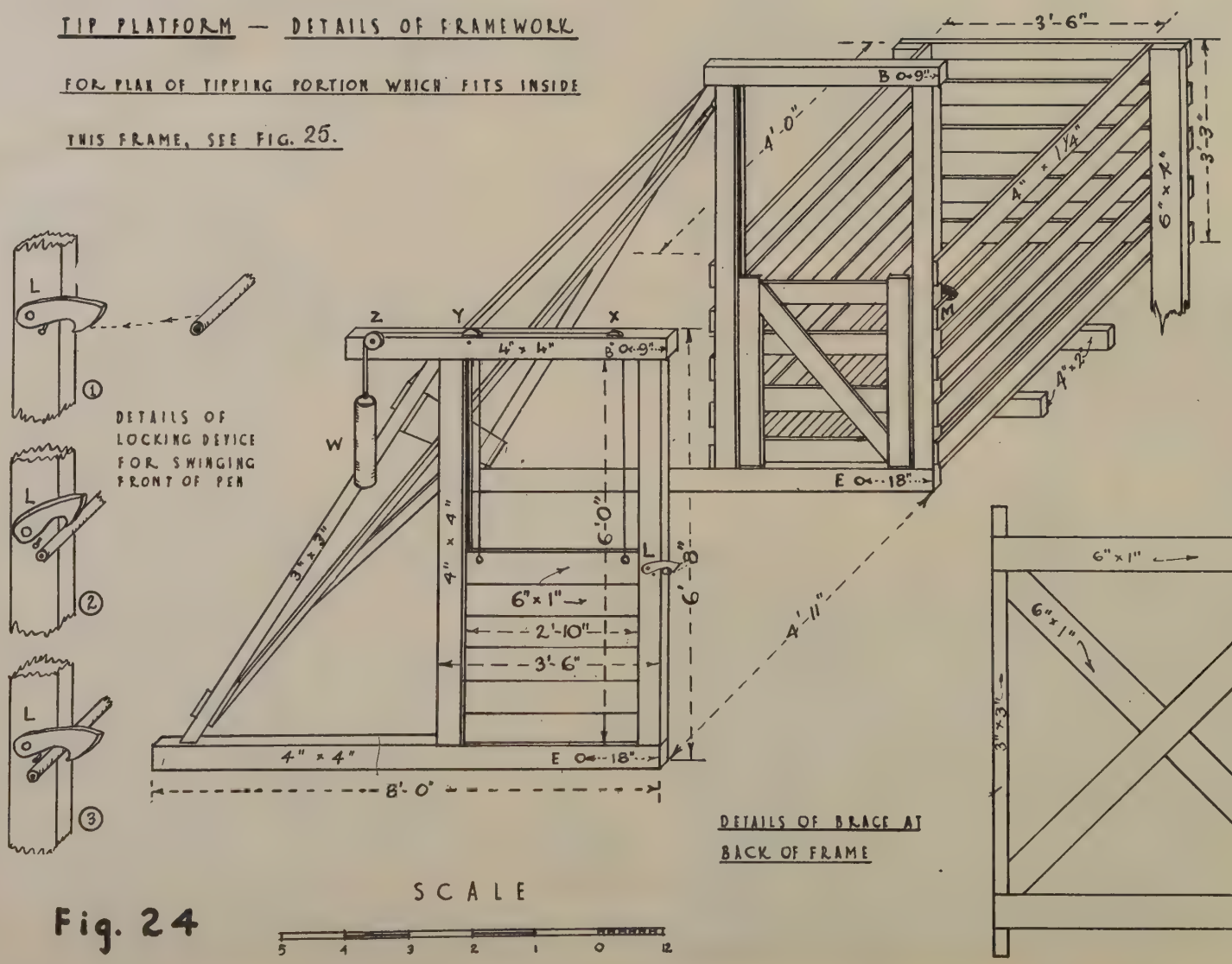
In Fig. 24 are shown the details and dimensions of the outer framework

(*Continued on page* 342).


TIP IN SHEEP DIP FOR MEDIUM SIZED FLOCKS: HOLDS 850-900 GALLONS
OVERFLOW PIPE FOR RAIN-WATER
PIPE
OPEN GUTTER
PIPE
SUMP.
LEDGE
REMOVABLE PERFORATED ZINC TRAY ¼" HOLES
INLET FROM DRAINING-PENS
GUTTER
GUTTER
TIP PLATFORM 3'-6" × 4'-11"
2" PIPE ON WHICH PLATFORM SWIVELS
7'-0"
5'-0"
3'-6"
5'-0"
3'-0"
3'-0"
6"
6"
A
B
PLAN
TIP
PLATFORM
12" RECESS FOR PLATFORM
12"
2 TO 1 GEARING
20"
24"
LEDGE
24"
18"
CROSS-SECTION ON LINE A-B
5'-0"
GATE: LOWER PORTION OF STEEL RODS FOR EASY MOVEMENT THROUGH LIQUID
CUT AWAY HERE TO SHOW CROSS-SECTION OF SUMP
CONCRETE REINFORCED WITH ⅜" DIA. RODS AT 9" CRS. BOTH WAYS, HEAVY GAUGE NETTING OR EXPANDED METAL
5'-0"
6"
3" GALV. PIPE
SCALE
5 4 3 2 1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39

TIP PLATFORM — DETAILS OF FRAMEWORK

FOR PLAN OF TIPPING PORTION WHICH FITS INSIDE THIS FRAME, SEE FIG. 25.



DETAILS OF LOCKING DEVICE FOR SWINGING FRONT OF PEN

DETAILS OF BRACE AT BACK OF FRAME

SCALE

Fig. 24

DETAILS OF TIPPING PORTION OF DIP — GIVING DIMENSIONS —

— SEE FIG. 24 FOR DETAILS OF OUTER FRAME —

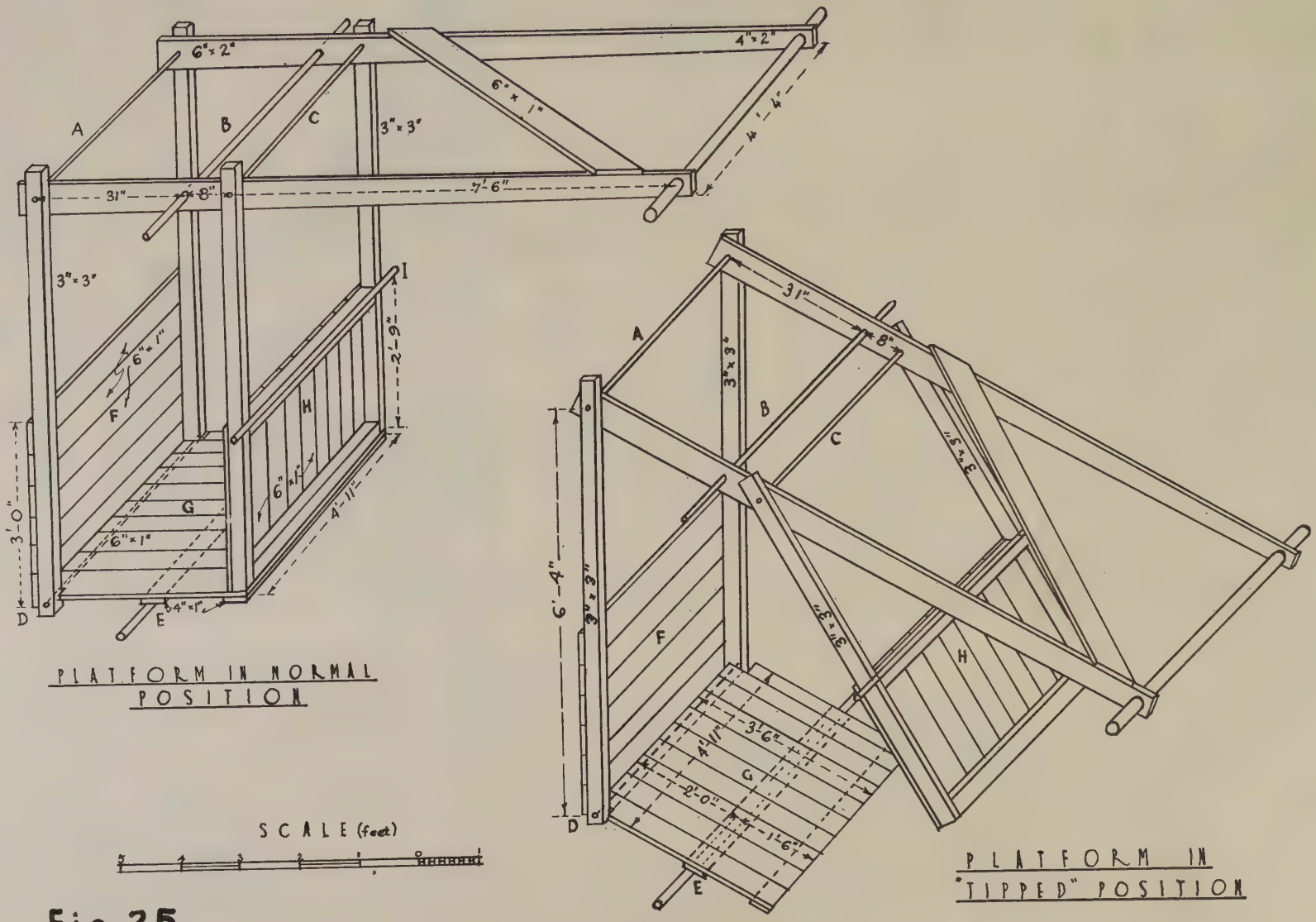


Fig. 25

which surrounds the tipping portion. The two have been depicted separately purely for the sake of clarity. On this plan are shown details of the brace at the back of the frame, and also details of the simple locking mechanism for the swinging apron H. It will be noticed in Fig. No. 25 that along the front of the apron is securely fastened a piece of pipe I, which projects about 6 inches at either end. When the apron swings back into position this pipe I strikes the catches L and M similar to a gate-latch.

These can be made of wood, but are much stronger and more satisfactory if made of metal. They are securely attached to the uprights of the frame, and, while being quite free to lift, they cannot drop below a horizontal position, because of the large nail projecting from the wood just below each of them. (Fig. 24).

It will thus be seen that when the main handle is tipped the apron H moves downwards until I is clear of the two catches L and M, and the apron is then free to swing outwards and allow the sheep to slide into the dip. H then swings back into place, and when the pipe I strikes the two catches L and M, they lift and then drop back into place, thus locking the apron securely in place once more.

On the plans, which are drawn approximately to scale, are given the dimensions of all the main members, including the construction of the decoy pen. It will be noticed that the gate giving access to the tip-platform is of the counter-balanced lift type, which is much the most suitable for this location. It will be seen that *both* ropes are attached to a *single* counter-weight. This ensures that the gate slides straight up and down without any tendency to coggle sideways.

Referring to Fig. 23 of the bath itself, there are one or two points which should be noted. The end of the bath has an extended sloping recess into which the platform can tip, thus bringing it as low as possible. The bath tapers in the usual way towards the bottom to give economy in the use of the dipping fluid, but the exit race is wider than usual, being 3 feet across. This is a valuable feature, as it allows the sheep to leave the bath two abreast, thus speeding up the operation without shortening the actual time the sheep are in the wash, which should not be less than one minute. In addition, should a sheep stop in the exit, as so often happens, it will not block the others, which will still have room to pass.

A valuable feature (omitted from this plan to prevent making it unduly complicated) is the provision round the top edge of the dip of an anti-splash lip. This lip is simply a curved beading about 2 to 3 inches wide and projecting inwards some 3 inches, and is very effective in preventing the fluid from splashing out of the bath when it is full. (See Fig. 26).

The exit gate (an essential part of any "pot" dip) is of a novel type which swings up out of the way. The gate itself is a grid of steel bars (so that it can be moved through the liquid easily) with just the top portion covered in with heavy galvanised iron to prevent the sheep seeing past it (see Fig. 19). On the end of the gate axle is fitted a small pinion, which meshes with a gear wheel about twice the size, to which is riveted the actual handle (Fig. 22). (A suitable pair of gears can be obtained from an old motor-lorry or mower.)

This handle should have a fairly heavy counter-weight attached to its outer end to balance the weight of the gate as it swings upwards. With this arrangement it is necessary to move the handle only a small distance to open the gate fully (the gate moves twice as far and twice as fast, thanks to the gearing), and in addition the handle is *moved away* from the dip, because the gearing reverses the direction of travel.

Materials Required

For the dip itself (including sump), 110 cu. ft. (approximately 4 cu. yds.) of concrete are required, which will need, using the 1 : 2 : 4 mix, 18 bags cement : 49 cu. ft. sand : and 99 cu. ft, gravel.

The quantities for draining pens will again be the same as given above for the Long Swim Dip. Plastering, if necessary, will require another 15 cu. ft. of sand and 7 bags of cement.

The following are the approximate quantities of timber required for building the tip-platform. No estimates of timber are given for the draining-pen fences, because these will depend on the type of construction chosen by the individual farmer:—

Size of Timber.	No. of Lineal Ft. Required.
6″ x 2″ (for main beams of handle)	25
6″ x 1″	140
4″ x 4″	50
4″ x 2″	20
4″x 1½″	90
3″ x 3″	50
2″ x 2″ (for battens in decoy pen)	65

There will also be required two posts about 6 in. x 4 in., the wire-rope, pulleys, and counter-weight for the gate, and sufficient nails (mostly 3 in. and 4 in.) for erecting the platform, etc.

For the cross-bar of the handle and the various pivots about 20 ft. of 1 in. and about the same quantity of ¾ in. pipe will be required.

Pot Dip

A good example of this type of dip was shown in the photograph (Fig 3) on page 253 in the April issue. In this case it is used in conjunction with a tip platform, but more often the sheep are simply put into it by hand from a small catching pen at the side of the dip. This simpler type is illustrated in Fig. 26, where all dimensions are shown.

It will be noticed that the bath is shown with a double-width exit, and that an alternative single-width exit is also shown. The double-width exit is much to be preferred, as already pointed out. It is really a fallacy to say that the double-width exit is unduly extravagant of dipping fluid, because, although it certainly takes more fluid to fill the bath in the first place, the fluid in the exit naturally runs back into the bath as it becomes empty. When it reaches the lowest level at which dipping can be safely carried out there is not a great deal of difference between the amount of fluid left in the bath with the double-exit as against that with a single-exit.

As the pot-bath is a popular type, Table I. (page 345) will be found useful by any farmer who is contemplating building one, as he can choose from it the size and capacity of dip which suits him. The quantities of concrete required for the various dips are given in terms of cubic feet. To convert these to cubic yards divide by 27. It will then be possible to work out the approximate quantities of cement, etc., required (where these are not given in the tables) by the use of the information set out on top of page 346.

Small Tank Dip

The small tank dip is illustrated by the photograph, Fig. 5, in the April issue, and by the diagram, Fig. 27, on page 343, which shows all the dimensions. The materials necessary to build it are set out in Table VII. on page 347. This small dip will require proportionately small draining-pens, and pens half the size of those described on p. 336 will be ample.

POT DIP - CAPACITY 650 GALLONS (WITH DOUBLE-WIDTH EXIT)

(IF SINGLE WIDTH EXIT IS USED CAPACITY WILL BE 520 GALS.)

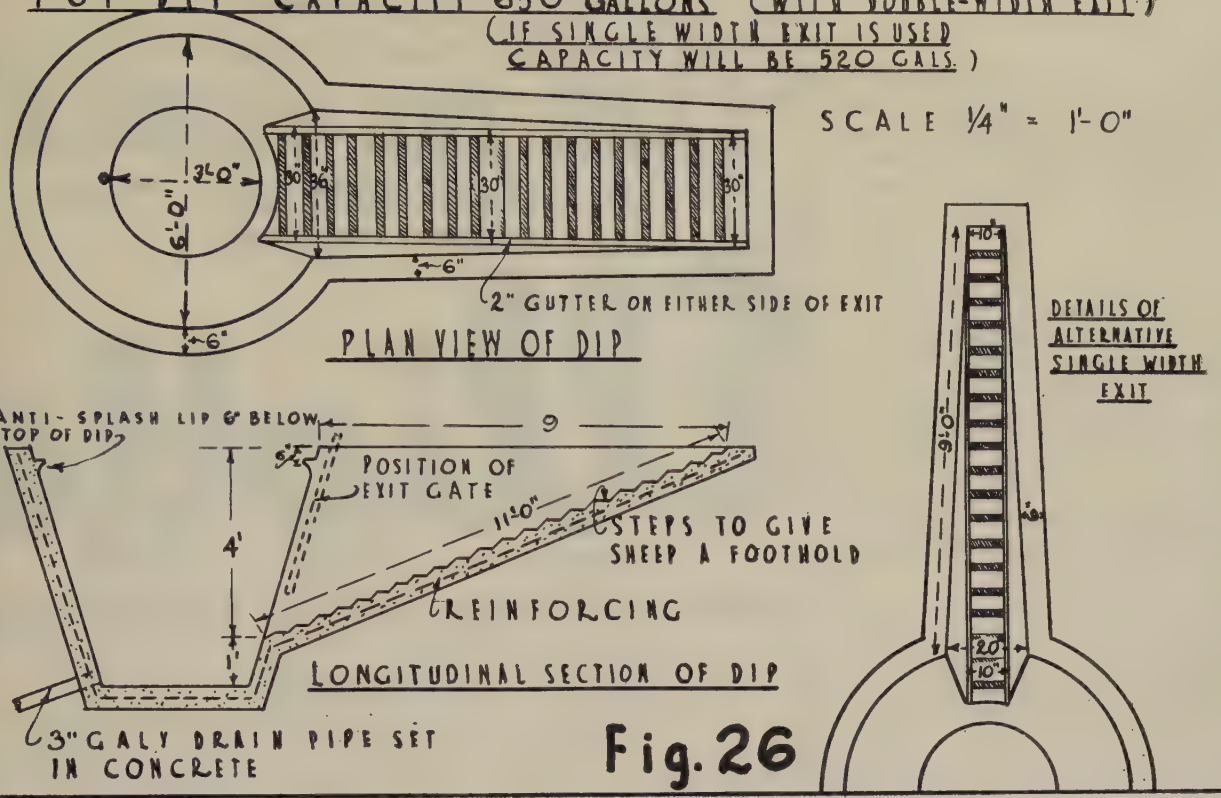


Fig. 26

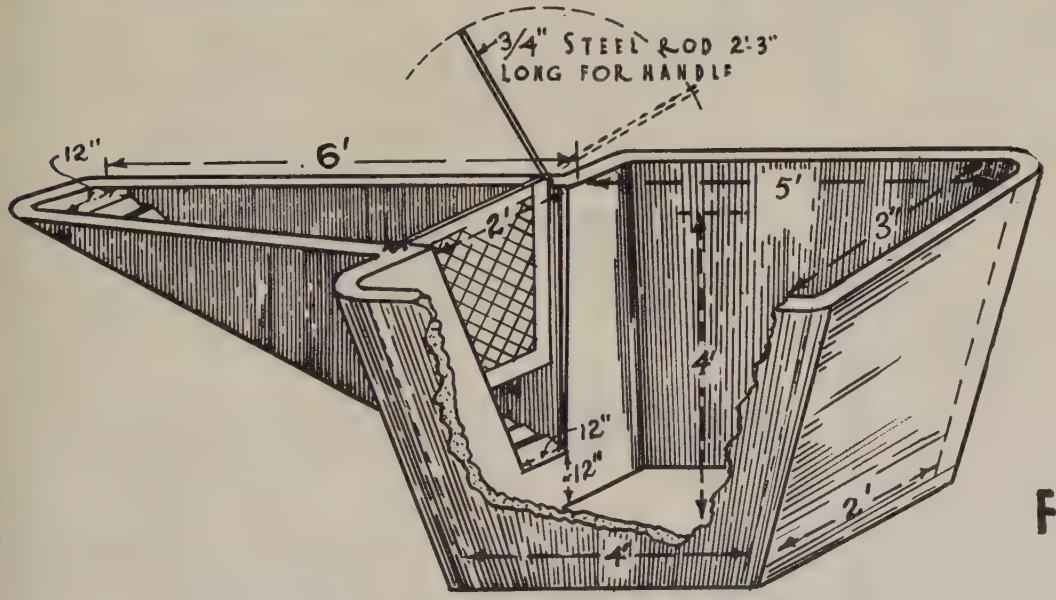


Fig. 27

DIAGRAMMATIC VIEW OF DIP SUITABLE FOR THE SMALLEST FLOCKS, OR FOR STUD SHEEP. WILL HOLD 2 FULL-GROWN SHEEP OR 3-4 LAMBS AT A TIME & HAS A CAPACITY OF APPROXIMATELY 300 galls. (350 TO BRIM)

Costs of Construction

In the series of tables given on page 345-347 are set out in detail estimates for the various types of dips. In compiling these tables several points had to be borne in mind. In the first place, costs vary considerably from one district to another, depending on such things as proximity to a railway or main highway, distance from nearest town or city, whether sand and gravel have to be carted a long way, and so on.

It is obviously impossible, therefore, to give any accurate costs which will apply throughout the country, and the costs given in the tables must be regarded as very approximate estimates only. Their main value is really for comparative purposes between one type of dip and another, and as the various items are set out in detail, with their costs alongside, a farmer can select only those which apply to his own particular case if he decides to modify the design in any way.

The costs given have been based on the hypothetical case of a farm in, say, Central Hawke's Bay or Canterbury, where materials such as iron and timber have to be carted approximately 100 miles (from Wellington or Christchurch), and where there are good supplies of gravel and sand available within a distance of not more than 20 miles. Where a contractor does the work it is assumed that he supplies all materials and does the work without any assistance from the farmer. Where the farmer and the regular farm hands do the job, cost of materials and cartage are all that have been allowed for. No charge has been allowed for labour on the assumption that this work is done at odd times when other work is slack, because, apart from the actual mixing and pouring of the concrete, the job can be done in stages. If the farmer has a motor-lorry and does his own carting, costs will be still further reduced. If he builds the dip first he can also economise by using the timber for the rails round the draining-pens as part of the boxing. A little cleaning afterwards will render it quite fit for its proper purpose again.

In the estimates allowance has been made for boxing both inside and outside, and this is generally desirable. In a few exceptional cases, however, the ground is of such a nature that most of the outside boxing can be dispensed with, which will, of course, reduce the cost correspondingly.

Making Concrete

It is not intended here to deal in any great detail with making concrete, as there are several excellent pamphlets on the subject available from the cement companies. It is thought desirable, however, to mention a few important points which should not be overlooked if good results are to be expected.

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30/- gal. 16/- ½ gal

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Table I.—Dimensions, Capacities, and Quantities of Concrete Required to Build Various Dips of the Pot Type.

Inside Diameter.		Inside Vertical Depth	Capacity in Gallons (With single-width exit)		Capacity in Gallons. (With double-width exit)		No. of Cubic Feet of Concrete required for Dip & Exit & Sump.	
At Top.	At Bottom.		Full to Brim.	Within 6in. of Top.	Full to Brim.	Within 6in. of Top.	With single-width exit.	With double-width exit.
6ft. 0in.	3ft. 0in.	5ft. 0in.	641 gall.	519 gall.	816 gall.	653 gall.	75 cu. ft.	81 cu. ft.
6ft. 6in.	3ft. 6in.	5ft. 0in.	759 gall.	630 gall.	934 gall.	764 gall.	80 cu. ft.	87 cu. ft.
7ft. 0in.	4ft. 0in.	5ft. 0in.	886 gall.	741 gall.	1061 gall.	875 gall.	86 cu. ft.	92 cu. ft.
7ft. 6in.	4ft. 0in.	5ft. 0in.	964 gall.	804 gall.	1139 gall.	938 gall.	88 cu. ft.	94 cu. ft.
8ft. 0in.	4ft. 0in.	5ft. 0in.	1042 gall.	856 gall.	1217 gall.	990 gall.	90 cu. ft.	96 cu. ft.

Note: The capacities in this table have been worked out mathematically from diagrams and are therefore exact. In practice, unless the dimensions are very closely adhered to throughout, the capacity of the finished dip will be found to vary more or less from the above. As a check, the finished dip should in all cases be calibrated by pouring into it measured quantities of water and marking the concrete at each 25 or 50 gallon level.

(1) Use good cement—as fresh as possible. Cement gradually deteriorates on exposure to the air.

(2) Use clean sharp sand and clean, hard, well-graded aggregate. For this class of work it should all pass through a ¾in. mesh sieve.

(3) Measure your quantities—don't just guess them.

(4) Use clean water free from dirt and organic matter. Do not use more than necessary.

(5) Mix thoroughly—first in the dry state and then after adding the water.

(6) Place the concrete as soon after mixing as possible—not longer than half an hour if possible. Put it in in layers 6in. to 8in. deep.

(7) Ram well, preferably with a piece of iron rod, to consolidate and get rid of air pockets.

Table II.—Summary of Approximate Costs of the Various Dips Described in Article.

Type of Dip.	Cost if Built by Contractor.	Cost of Materials and Cartage only. Work done by farmer.
	£ s. d.	£ s. d.
Long Swim Dip (See Fig. 13)	124 1 6	51 1 3
Island or Ring Dip (See Fig. 17)	60 13 3	24 3 3
Tip-Platform Dip (See Fig. 23)	55 17 6	26 11 9
Pot Dip, 6 ft. Diameter, Double Exit (See Fig. 26)	39 1 9	15 12 6
Pot Dip, 6 ft. Diameter, Single Exit (See Fig. 26)	37 3 3	15 1 6
Pot Dip, 8 ft. Diameter, Double Exit	47 15 0	19 15 0
Pot Dip, 8 ft. Diameter, Single Exit	46 2 6	18 5 6
Small Tank Dip (See Fig. 27)	12 14 3	4 11 6
Concrete Work for draining pens as described on p. 336	41 6 0	21 16 3

(8) Avoid any construction joints if possible, but if they are unavoidable coat the surface with cement and water mixed to a creamy consistency before placing fresh concrete.

(9) Do not remove the boxing too soon—wait until concrete is thoroughly set.

(10) Cure slowly and thoroughly by covering with wet sacks or spraying with water for at least a week.

If the points just enumerated are carefully followed the concrete should be quite watertight and plastering will be unnecessary unless for the sake of appearance.

Table III.—Estimates for Long Swim Dip (Fig. 13).

Item.	Unit.	Quantity.	Rate.		Cost.	
			Materials supplied by, and work done by contractor.	Rate for materials and cartage only. Work done by farmer.	If work done by contractor.	If done by farmer.
					£ s. d.	£ s. d.
Excavation: Excavate to formation level with slight batters if necessary. Back fill after removal of boxing and tamp.	cu. yds.	53	6/-	—	15 18 0	—
Boxing: Wood dressed one side and both edges	sq. yds.	110	7/6	3/6	41 5 0	19 5 0
Reinforcing steel	Tons	0.31	£32	£24	9 18 6	7 9 0
Concrete:						
1:2:4 mix, composed of—	cu. yds.	11.4	£5	—	57 0 0	—
(*a*) Cement	Bags	50	—	6/6	—	16 5 0
(*b*) Sand	cu. yds. (or cu. ft.)	5 (135)	—	10/-	—	2 10 0
(*c*) Coarse aggregate, ¾in. max. size	cu. yds. (or cu. ft.)	10.2 (275½)	—	11/-	—	5 12 3
					£124 1 6	£51 1 3

To make a cubic yard of strong concrete (1:2:4 mix) the following ingredients are required:—

4 bags cement,
11 cubic feet of sand,
22 cubic feet of gravel (not exceeding ¾in.).

These quantities are measured *loose*—not packed down or rammed—and the easiest way to measure them is to make a cubical wooden box measuring 1ft. each way, but without either top or bottom to it. This is placed on the mixing board, filled level, and then lifted up, leaving the measured quantity behind.

Acknowledgments

The author wishes to express his thanks to the following, who were of material assistance in helping to compile this article:—

Messrs. Cooper, McDougall, and Robertson (N.Z.) Ltd., for kind permission to reproduce the plan (Fig. 16) and description of a walk-in entrance.

Mr. E. L. Dollimore, of the Public Works Department, who drew the plans to scale from my designs.

Mr. M. A. Craven, of the Public Works Department, who worked out the estimates given in the tables.

[*All photographs and designs by the author*].

Table IV.—Estimates for Island or Ring Dip (Fig. 17).

Item.	Unit.	Quantity.	Rate.		Cost.	
			Materials supplied by, and work done by contractor.	Rate for materials and cartage only. Work done by farmer.	If work done by contractor.	If work done by farmer.
Excavation: Excavate to formation level with slight batters if necessary. Back fill after removal of boxing and tamp.	cu. yds.	30	6/-	—	£ s. d. 9 0 0	£ s. d. —
Boxing: Wood dressed one side and both edges	sq. yds.	52	7/6	3/6	19 10 0	9 2 0
Reinforcing steel	Tons	0.13	£32	£24	4 3 3	3 2 6
Concrete:						
1:2:4 mix composed of:—	cu. yds.	5.6	£5	—	28 0 0	—
(*a*) Cement	Bags	24.6	—	6/6	—	7 19 3
(*b*) Sand	cu. yds. (or cu. ft.)	2.46 (66.5)	—	10/-	—	1 4 6
(*c*) Coarse Agggregate ¾in. maximum size	cu. yds. (or cu. ft.)	5.00 (135)	—	11/-	—	2 15 0
					£60 13 3	£24 3 3

Table V.—Estimates for Tip-Platform Dip (Fig. 23).

Item.	Unit.	Quantity.	Rate.		Cost.	
			Materials supplied by, and work done by contractor.	Rate for materials and cartage only. Work done by farmer.	If work done by contractor.	If work done by farmer.
Excavation: Excavate to formation level with slight batters if necessary. Back fill after removal of boxing and tamp.	cu. yds.	27	6/-	—	£ s. d. 8 2 0	£ s. d. —
Boxing: Wood dressed one side and both edges	sq. yds.	23	7/6	3/6	8 12 6	4 0 6
Reinforcing steel	Tons	0.27	£32	£24	8 13 0	6 9 6
Concrete:						
1:2:4 mix composed of:—	cu. yds.	4.1	£5	—	20 10 0	—
(*a*) Cement	Bags	18	—	6/6	—	5 17 0
(*b*) Sand	cu. yds (or cu. ft.)	1.80 (48.5)	—	10/-	—	18 0
(*c*) Coarse Agggregate ¾in. maximum size	cu. yds. (or cu. ft.)	3.65 (98.5)	—	11/-	—	2 0 3
Tip Platform	—	—	£10	—	10 0 0	—
Wood	super ft.	290	—	28/- per 100 sup ft. and £1/5/6 cartage	—	5 6 6
Galvanised pipe (if bought new)	—	—	—	30/-	—	1 10 0
Pulleys, bolts, nails, etc.	—	—	—	10/-	—	10 0
					£55 17 6	£26 11 9

Table VI.—Estimates for Pot Dip—With Double-width Exit. 6ft. Diameter.

Item.	Unit.	Quantity.	Rate.		Cost.	
			Materials supplied by, and work done by contractor.	Rate for materials and cartage only. Work done by farmer.	If work done by contractor.	If work done by farmer.
					£ s. d.	£ s. d.
Excavation: Excavate to formation level with slight batters if necessary. Back fill after removal of boxing and tamp.	cu. yds.	20	6/-	—	6 0 0	—
Boxing: Wood dressed one side and both edges	sq. yds.	43	7/6	3/6	16 2 6	7 10 6
Reinforcing steel	Tons	0.08	£32	£24	2 11 3	1 18 6
Concrete:						
1:2:4 mix	cu. yds.	2.88	£5	—	14 8 0	—
composed of:—						
(*a*) Cement	Bags	12.7	—	6/6	—	4 2 6
(*b*) Sand	cu. yds. (or cu. ft.)	1.27 (34.5)	—	10/-	—	12 9
(*c*) Coarse Agggregate ¾in. maximum size	cu. yds. (or cu. ft.)	2.56 (69)	—	11/-	—	1 8 3
					£39 1 9	£15 12 6

Table VII.—Estimates for Small Tank Dip (Fig. 27).

Item.	Unit.	Quantity.	Rate.		Cost.	
			Materials supplied by, and work done by contractor.	Rate for materials and cartage only. Work done by farmer.	If work done by contractor.	If work done by farmer.
					£ s. d.	£ s. d.
Excavation: Excavate to formation level with slight batters if necessary. Back fill after removal of boxing and tamp.	cu. yds.	8.8	6/-	—	2 12 9	—
Boxing: Wood dressed one side and both edges	sq. yds.	10	7/6	3/6	3 15 0	1 15 0
Reinforcing steel	Tons	0.01	£32	£24	6 6	4 9
Concrete:						
1:2:4 mix	cu. yds.	1.2	£5	—	6 0 0	—
composed of:—						
(*a*) Cement	Bags	5.30	—	6/6	—	1 14 6
(*b*) Sand	cu. yds. (or cu. ft.)	0.53 (14½)	—	10/-	—	5 0
(*c*) Coarse Agggregate ¾in. maximum size	cu. yds. (or cu. ft.)	1.10 (30)	—	11/-	—	12 3
					£12 14 3	£4 11 6

Table VIII.—Estimates for Double Draining-pen (See p. 336)

Item.	Unit.	Quantity.	Rate.		Cost.	
			Materials supplied by, and work done by contractor.	Rate for materials and cartage only. Work done by farmer.	If work done by contractor.	If work done by farmer.
					£ s. d.	£ s. d.
Reinforcing steel	Tons	.25	£32	£24	8 0 0	6 0 0
Concrete:						
1:2:4 mix	cu. yds.	7.4	£4/10/-	—	33 6 0	—
composed of:—						
(*a*) Cement	Bags	32.6	—	6/6	—	10 11 3
(*b*) Sand	cu. yds. (or cu. ft.)	3.26 (88)	—	10/-	—	1 12 6
(*c*) Coarse Agggregate ¾in. maximum size	cu. yds. (or cu. ft.)	6.60 (178)	—	11/-	—	3 12 6
					£41 6 0	£21 16 3

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Green Manuring

Department of Agriculture Still Advocates Ploughing-in Of Green Cover Crops

By the FIELDS DIVISION, DEPARTMENT OF AGRICULTURE.

Statements recently made in an Auckland newspaper by an officer of the Department of Scientific and Industrial Research that green manuring is of little value and can even be harmful are not subscribed to by the Department of Agriculture, which is unaware of any data supporting this contention and still advocates the practice of ploughing under green crops.

AN ACCOUNT recently appeared in the "New Zealand Herald," Auckland, purporting to convey the opinion of Mr. J. C. Neill, Chief Mycologist of the Plant Diseases Division, Department of Scientific and Industrial Research, in regard to the value of green manuring. From this report, the farming public was led to believe that scientific workers condemned the practice of ploughing under green crops, a practice which has been consistently advocated, and will still be advocated, in the pages of this "Journal," by officers of the Department of Agriculture.

Mr. Neill, in a letter published in the "Herald" on March 9, 1940, contends that his views were incorrectly reported, and in view of the number of inquiries which have reached the Department of Agriculture as a result of publication of the article, the portion of Mr. Neill's letter to the editor of the "Herald" dealing with green manuring is published below.

The Department of Agriculture, however, does not accept in its entirety that portion of Mr. Neill's statement which seems to indicate that it is bad practice to plough in cover crops when they are green, and that to be of maximum advantage the plants should be allowed to mature. This is contrary to generally-accepted practice, and while Mr. Neill's theory may prove to be correct, the Department of Agriculture is unaware of any experimental data supporting his contention.

Copy of a letter addressed to editor of the "New Zealand Herald," dated March 9 1940:—

Sir,—There appears to be some misconception in regard to my statements on "humus," as published under the heading "Science Quests," in your issue of March 4. I certainly did not deny the necessity of humus in building up soil fertility—that is a mechanical and biological condition most suitable for normal plant growth. What I did tilt at was, first, the thoroughly unscientific theory that diseases of plants, and of human and animal consumers of plants, were caused by lack of humus in soil and the use of chemical fertilisers. Diseases are caused, in the main, by specific parasitic organisms, and are as likely to attack plants growing in soils rich in humus as in those low in humus, or even in water culture with no humus. Second, the mistake implied in the term "green" manuring. By all means cherish the compost heap and grow cover crops for digging in, but not "green." To be of maximum value, the plants should be allowed to mature, that is, the more fibrous and less sappy the better. Any gardener who buries his lawn clippings in a heap knows what a sour, evil-smelling mass results and how little residue is left after a few weeks.

(Signed) J. C. NEILL,
Plant Diseases Division, Owairaka.

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A well-fed, well-housed sow and litter.

—By—

C. E. BALLINGER,

Research Officer in Animal Nutrition,
Ruakura Farm.

Trials recently conducted at the Ruakura Animal Research Station indicate the value of feeding sows immediately after weaning. Not only does it mean more pigs per litter, but the feeding also fits in with the skim-milk supply, as does feeding six weeks before farrowing.

TOO MANY, the nutrition and management of the breeding sow begins at or shortly before farrowing, and the production of a good litter is a matter of feeding the sow moderately well after farrowing with some extra food for the suckers from three to eight weeks of age. A few minutes' thought, however, brings home the fact that with the sow more than with any other animal, production is continuous and makes a high demand on the sow's constitution.

Of all our farm animals the sow is the most intensive producer, and unfortunately the most neglected. Everyone accepts the fact that in order to obtain a high lambing percentage the ewe must be in a rising condition at mating, and that condition must be regulated afterwards or there will be trouble at lambing time.

No Store Period

In spite of the fact that the sow has no store period between weaning and mating in which to regain condition, her sole diet on many farms consists of poor pasture from weaning until the next farrowing.

Where management is somewhat better, supplementary feed is given a few weeks before the sow farrows, but very often the quantity or quality of the feed is not sufficient to allow the sow to regain very much of her lost condition.

The practice of feeding the sow a few weeks before farrowing is based on the fact that the unborn litter increases in size very rapidly over that period. This practice, however, can have no effect on the number of suckers born—although it may have a very definite effect on the number born alive—and this is equally as important as their individual weight.

If nutrition is to have any effect on litter numbers its influence will be felt at or shortly after mating rather than before farrowing. A sow which has reared a good litter is often in low physical condition immediately after weaning. She is probably turned out on pasture and run with the boar. If she returns to the boar in three weeks' time she will be in as poor a condition for service as at weaning. Further, it is likely that poor nutrition during the first few weeks after conception can have a very considerable influence on the survival of the fertilised eggs. Examination of the genitive organs of in-pig sows has shown that only about half of the fertilised eggs reach maturity; the remainder degenerate,

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particularly in the early stages of pregnancy. At this stage nutrition can play a most important part.

Trials at Ruakura

Investigation into the influence of nutrition is now proceeding at Ruakura Animal Research Station, and while the trial must be carried over a number of farrowings and a change-over in treatments imposed, the results already obtained are of considerable interest. Furthermore, they are substantiated by an investigation carried out at the Missouri Agricultural Experimental Station, U.S.A. The experiment was primarily to investigate the effect of early breeding of immature sows on various planes of nutrition, and one conclusion reached by the American workers was as follows:—

"There is a very definite correlation indicated between the gains made the month following breeding and the number of pigs farrowed. Attention is drawn to the high pre-natal death rate in pigs and that size of litters in swine can be more properly controlled by care of the sow immediately after breeding."

Groups and Treatment

The investigation was designed to determine the influence of nutrition during the pregnancy period and to compare present farm practices with what might reasonably be expected to influence litter production. Twenty sows were selected and placed on trial immediately after they had weaned their maiden litter. Four groups were formed, and treatments were imposed as follows:—

Group 1.—Pasture only from weaning until farrowing.

Group 2.—Pasture only until six weeks before farrowing, when each sow received 5 lb. of meal per day, and if a sow was in very poor condition she received up to 10 lb. per day to bring her back to condition.

Group 3.—Pasture, and fed throughout with 5 lb. meal from weaning until farrowing.

Group 4.—Pasture, and fed 5 lb. of meal the first six weeks after weaning, followed by pasture only until farrowing.

The concentrate ration consisted of the following mixture:—1½ lb. meat-meal, 2 lb. maize-meal, ½ lb. pollard.

The sows of all groups were run on topdressed pasture, and had access to a mineral lick, which was not touched.

The Common Practice

The treatments imposed on Groups 1 and 2 are common farm practice, with Group 1 forming the basis of comparison for the other groups. Group 2 treatment investigates the effect of nutrition on the latter part of the gestation period. Group 3 treatment ensures adequate feeding over the entire period. Group 4 treatment allows the sow to regain condition immediately after weaning. Thus, all stages of the gestation period are examined, and the results of such treatments can now be given.

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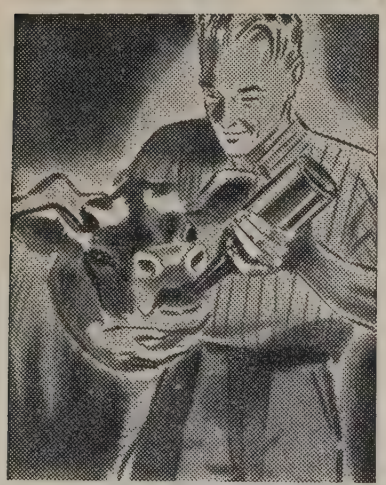

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The following table summarises the live-weight variation obtained by the feeding treatments outlined. Live-weight gains are given for the whole period, and also for the first six weeks after weaning and the last six weeks before farrowing.

Table 1.—Sow Nutrition.

Group No.	Treatment	Live-weight		Av. Gain per Day	Period Gain per Day	
		Initial	Final		1st 6 wks.	Last 6 wks.
		lb.	lb.	lb.	lb.	lb.
1	Pasture only	245	304	.51	.46	.35
2	Pasture and fed last 6 weeks	266	348	.71	.45	.90
3	Pasture and fed throughout	321	451	1.14	1.14	1.0
4	Pasture and fed first 6 weeks	261	324	.59	1.22	.10

Group 1.—Sow on Pasture Only.

Although sows do maintain themselves on pasture alone their digestive system does not allow them to make the same use of pasture as that of a cow, especially if the pasture is poor and fibrous. From work carried out at Ruakura it has been found that a 360 lb. sow eats about 23 lb. of grass a day. Even with good-quality pasture this is little more than a maintenance ration, and when allowance is made for the weight of the unborn litter, sows on pasture put on about 35 lb. live-weight, or a total weight of about 60 lb. In spite of this increase, a sow in poor condition remains poor throughout when run on pasture only. Such sows can have little or no reserves to draw on when suckling the young, and cannot be expected to give their best.

Group 2.—Sows Fed Six Weeks Before Farrowing.

Under these conditions, sows turned out to pasture slowly regain some condition until feeding begins. Feeding 5 lb. of concentrates or 5 gallons of separated milk a day causes a rapid increase in live-weight gain from ½ lb. to nearly 1 lb. a day. Even this does not allow a sow in poor condition to become by any means fat by the time she is due to farrow, but she does increase her weight by about 80 lb. compared with sows gaining 60 lb. on pasture only.

Group 3.—Sows Fed Throughout.

Sows fed on the concentrate ration throughout in addition to what pasture they care to graze are in excellent condition all the time. Such treatment, however, is neither economic nor necessary under good grazing conditions, but was necessary for experimental purposes in order that all phases of the pregnancy period could be examined. Such a treatment allows the sow to put on about 130 lb. of live-weight, and they are always in what is usually described as "show condition."

Group 4.—Sows Fed Six Weeks After Weaning.

Sows which have weaned a good litter are invariably in lean condition at weaning, even though they were in excellent condition at farrowing. From all aspects of the health of the sow a quick return to good condition is desirable. Sows fed 5 lb. of meal for six weeks after weaning increase their weight at the rate of nearly 1 lb. a day compared with those on pasture only gaining about .4 lb. per day. Herein lies the advantage of feeding the sow for six weeks after weaning. The sow is in a rising condition at mating, and is still in a rising condition if she returns to the boar. The ration is in fact a "flushing" ration similar to that employed in the management of a fat lamb flock of breeding ewes.

Results of Underfeeding

There is one other important factor. No trouble was experienced in settling sows of Groups 3 and 4. In Group 1, however, one sow in poor condition at weaning would not hold at mating and returned to the boar repeatedly.

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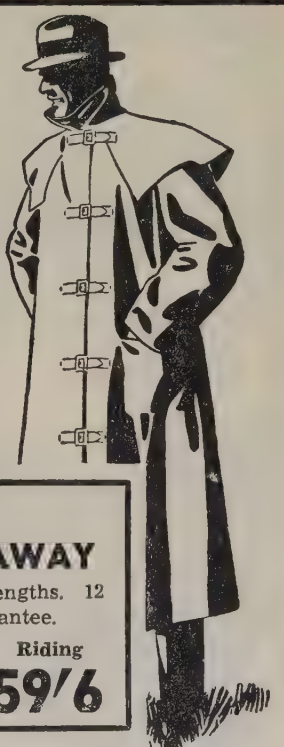
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This sow was eventually fed until she regained condition. She was then run on pasture for a period and mated. She then held to the boar. In Group 2 the same trouble was experienced with one sow. A second sow, also Group 2, was mated and was apparently settled, being tested two or three times, and did not return to the boar. This sow was brought in for feeding the last six weeks before farrowing, and a few days after feeding began she came on heat. Whether low condition before feeding had caused this sow not to come on heat, or whether the young were reabsorbed because of her low condition does not matter; the point was that considerable trouble and loss of time were experienced with three sows which were underfed.

Litter Production and Nutrition.

The value of any new practice in pig-keeping is best demonstrated by the production obtained, and the following table summarises litter production under the various treatments already described:—

Table 2.—Litter Production.

Group No.	Treatment.	Piglets born alive	Weaned	Litter Weights at 8 wks.	
				Mean weight	Total weight
				lb.	lb.
1	Pasture	6.2	6.0	43.3	258.0
2	Pasture and fed last 6 wks.	6.3	5.6	46.0	253.4
3	Pasture and fed throughout	9.6	7.8	44.1	344.5
4	Pasture and fed 1st 6 wks.	9.6	9.2	37.4	345.7

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It must again be stressed that the results need confirmation by carrying the trial over several farrowings, and while there are a number of factors in the production of big litters and high weaning weights, it is not necessary to go into them at this stage. The two main factors to consider are the number of piglets born and reared, and the total litter weight produced.

In this trial the feeding of the sow over the first six weeks (Group 4) increased the number born by nearly three pigs per litter, as compared with Groups 1 and 2.

Litter Weights Analysed

Such an increase in numbers gives a correspondingly large increase in the total litter weight, although the average weight per pig may be less. The total litter weight produced by Group 4 is 92.3 lb. greater than that for Group 2. The fact that the average weaning weight for Group 2 is more than 8 lb. greater than that for Group 4 does not make up the deficiency in numbers, and the weaning average of 37.4 lb. is quite good. The decrease in numbers weaned for Group 3 compared with Group 4 was not due to weak piglets, but to the clumsiness of two of the sows, one of which overlay three piglets and the other four piglets. All the sows in this group were in very high condition.

The decrease in the average weaning weight for Group 4 again demonstrates the importance of sow nutrition and its influence both before and after farrowing. In this instance the milking ability of the sows and litter numbers must be considered. It will be seen from Table 1 that the live-weight increase, food eaten, and therefore condition of the sows, in Groups 2 and 4 was similar. But Group 4 sows had to suckle three pigs more per litter.

These sows had as many piglets to suckle as the Group 3 sows, but the Group 3 sows were in high condition and could milk off that condition, which in turn would be reflected in the three-week weights of the litters before creep feeding began. This was substantiated by the weights of the litters at three weeks, when the mean weight was 12.7 lb. for Group 3 piglets and 9.4 lb. for Group 4.

Cost of Feeding

The final test to the pig producer of any feeding trial is the improved

return he gets when that feeding is put into practice. Herein lies the value of feeding sows immediately after weaning. Not only does it mean more pigs per litter, but the feeding also fits in with the skim-milk supply, as does feeding six weeks before farrowing. If sows farrow at the end of July and again at the end of January, then feeding six weeks before the July farrowing means feeding in June and July, when separated milk is scarce and meals must be used; but feeding six weeks after weaning means feeding in October and November, when milk is plentiful and no meals are necessary.

Feeding sows after the January farrowing means feeding them in April and May. At this time there is still some separated milk, and therefore feeding for six weeks after weaning does not call for any more purchased meals than feeding for six weeks before farrowing.

What is Required

What is required to make our New Zealand sow feeding approach the ideal is a better appreciation of a sow's requirements throughout the year. Feeding immediately after weaning until the sow recovers condition is essential; feeding from then on is a matter of judgment. If good pasture is plentiful, then no extra feed is required until a few weeks before farrowing. Six weeks before farrowing the unborn litter grow about twice as fast as they did the previous ten weeks. Two or three gallons of skim-milk or pounds of meal a day would improve the feeding position and "steam up" the sow for farrowing.

During the winter months pasture is scarce, and pig farmers must be prepared to make extra provision for their sows. When skim-milk is scarce the next best thing is meat-meal, and 1½ lb. of meal a day should be the minimum for a sow. The remainder of the ration can be best made up with roots, pumpkins, maize, and pasture.

Short Course For Farmers

The following short courses for farmers will be held at the Animal Research Station, Ruakura, during the coming winter:—

Dairy Farming Course: June 24-28.
Farm Management Course: June 1-5.
Course for Maori Farmers: June 8-12.

The Dairy Farming course has been designed for those who have not previously attended a Ruakura course, while the Farm Management course will be more suited for those who have already taken the former in a previous year.

The course for Maori farmers will be similar to the Dairy Farming course.

Visits to leading farms will be paid during each course.

For each of the above courses the cost of accommodation and transport will be 27/6. Further information regarding these courses may be obtained on application to the Fields Superintendent, Department of Agriculture, Hamilton.

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THE BEST VALUE TRACTOR PLOUGHS IN NEW ZEALAND!

Ploughs and Ploughing

Functions and Care of Various Types and Designs

— By —
A. R. DINGWALL,
Instructor in Agriculture, Wanganui,
and
M. J. CAMPBELL,
Assistant Manager, Ruakura Animal Research Station.

The plough is the symbol of civilisation. When man with a crooked stick began to till the soil he ceased to be a nomadic hunter, and with each development of the plough there has been a corresponding advance in man's social and economic attainments. In the beginning man alone was the tiller of the soil, and the acreage he cultivated was small. Later he brought to his aid the services of the animals he had domesticated, and his output from the soil increased. Now, with mechanical power, the crops which he raises form the basis of international trade.

PLOUGHS have been designed to work under a wide variety of soil and topographical conditions as well as to produce differing mechanical effects in their passage through the soil. The result has been to produce a very wide range of types, each particularly adapted for a certain kind of work, or for special conditions of soil, or for the power available for traction.

Apart, however, from differences in design, certain basic features are common to most ploughs, and the general principles of operation are the same for all.

The parts shown (Fig. 1) are typically embodied in a general utility plough of standard design, although in ploughs intended for special purposes, certain of these may be modified or omitted altogether.

Parts of the Plough

Functions

The function of the coulter, share, and mouldboard are as follows. In ploughing, the furrow slice is cut vertically by the coulter and horizontally by the share, and is detached, inverted, and placed by the mouldboard. Traction is applied by means of a chain attached to the brake on the quadrant head, and provision is here made so that the angle of pull can be adjusted either vertically or horizontally.

While the number of wheels fitted depends on the type of plough, that shown in the diagram is provided with two wheels (a land wheel and a furrow wheel), which serve to regulate the width and depth of the furrow, and to some extent reduce the effort required for draught.

Because of their importance as affecting the actual setting of a plough as well as the type and quality of the work performed, the coulter, share, and mouldboard are worthy of special mention.

The Coulter

Two types of coulter have been developed for general purpose work—the knife coulter and the disc coulter or skeith. The knife coulter is generally preferred for use on hard land. It is heavier in draught than the disc coulter, but it gives better penetration and there is less tendency for the plough to lift.

The coulter is secured to the beam of the plough by a clamp, and can be adjusted either forwards or backwards. The stem is frequently rounded to allow of a set towards the land.

Two types of disc are in common use:—

(a) The rolling fixed disc.

(b) The rolling swivel disc.

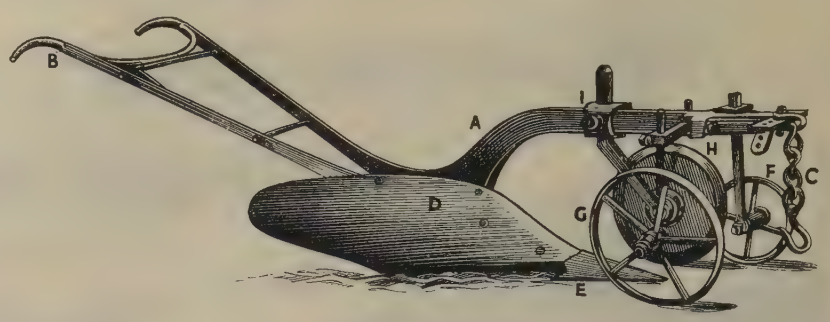
These are available in a convertible form, which has definite advantages. For hillside work the fixed disc is preferred, as it holds the plough up to its work, but for stony ground the swivel type will be found more useful, as it is better able to avoid an obstruction. The disc type of coulter is generally preferred to the knife, as it can be set to give an undercut furrow slice, which is easily pressed down and which can be very easily and effectively harrowed.

Apart from being lighter in draft than the knife coulter, the disc is better adapted for cutting turf or

vegetable matter, and the swivel coulter is particularly adapted for work where stones or other obstructions are liable to lodge between coulter and share. They are also better when large stones or sunken timber may be encountered, as they tend to ride over an obstacle and so prevent damage to the share.

Skim Coulter

Where turf or surface material requires to be buried, a skim coulter is usefully employed. This may be designed either in the form of a curved steel knife or of a miniature plough. It is attached behind the coulter, and as the furrow lifts, the skim coulter trims off the edge of the turf, so that when inverted there is no grass or turf left ready to develop new growth between the edges of the furrows. For work on old turf or dirty land the skim coulter may be regarded as indispensable, and its more general use in the original ploughing would frequently obviate much labour at later cultivations.



The parts of a plough.—A, beam; B, handle; C, draught chain; D, mouldboard; E, share; F, land wheel; G, furrow wheel; H, disc coulter, or skeith; I, coulter clip.

Coulters are now usually made in the self-sharpening pattern, and are capable of long service without attention. When worn down, the disc pattern is easily and cheaply replaced.

An Open Letter

Prior to the publication of the April issue of this Journal I had arranged for the insertion of the full page advertisement which appears elsewhere in this issue. As an article on page 279 of the April issue mentions the "Alfa" Harrow (which has been off the market for 3½ years) of which I am the patentee, I feel I should make some explanation to save confusion in the minds of Farmers. While some thousands of "Bevin" users appreciate the vast difference between the "Alfa" and the "Bevin," it is necessary for me to emphasise this, because it appears politic for some firms in opposition to me to tell farmers that the two Harrows are the same.

The **"Alfa"** Harrow donated in 1934 to the experimental station at Marton was the very first model. I discovered in 1934 that this Harrow was unduly severe for a really good pasture, although, as is admitted in the article, it was of some merit for the harrowing of sod-bound swards and the preparation of pastures for surface sowing. The severity of subsequent models of "Alfa" Harrows was lessened to a degree. However, it could not be set lightly enough for a really good pasture. In 1936 I designed the present "Bevin" point which is suitable for all requirements as it can be adjusted to cut from ¼in. penetration to medium, deep, or very deep cut.

Had I been aware that these experiments were being conducted I would certainly have suggested that a "Bevin," which is superior in very many ways to the "Alfa" be used. It is doubtful, however, whether my suggestion would have been acceptable because on the 1st of February, 1939, I wrote suggesting that an "Alfa" on another Government Experimental Station be replaced by a "Bevin" and that trials be conducted there. Although this particular Station had shown an increase of between 9% and 10% in production on a Paspalum pasture with an "Alfa," and although I could definitely promise more comprehensive results from any class of pasture with the "Bevin," **to date my suggestion has not been acknowledged or availed of.**

To use a 1933 model Harrow at the Marton Experimental Station in 1939 can be likened to an Automobile Association conducting now an efficiency test on a certain make of car and using a 1933 model for their tests.

However, although Page 279 of the April issue could possibly be detrimental to my business, there is a definite ray of sunshine in the same issue. Please turn to Page 277. Here is a copy of a letter received from Messrs. Pearson Bros. after they won the "Best Kept Farm Competition" mentioned on that page. They write on the 29/9/39 :—

> "We have used the Harrow over the whole farm, and are very pleased with the results we are getting, especially from harrowing in dry weather. We harrowed some paddocks last February, when it was very dry, and when the rain came the response was very marked. We have recommended your Harrow to quite a number of farmers around here."

Peculiarly enough on the 12/4/40 Mr. C. H. J. Wily, a son of Mr. H. E. R. L. Wily (who presented the handsome cup for the winner of the Competition) called upon us and bought an 8ft. "Bevin" Harrow. The fact that the "Bevin" is used on many parks and domains throughout New Zealand is proof that the Harrow can be used on the finest of swards without detriment and with much benefit.

Read what Mr. H. C. Watson, of the Eden Park Cricket Ground, says on the 14/2/38 :—

> "I have no hesitation in saying that for reconditioning a ground such as Eden Park after and also during the football season, they are unequalled. Not only do they remove weeds, thicken the sward, but also they are ideal for preparing the seed-bed for re-sowing at top-dressing time. They are easily adjusted for heavy or very fine work, and can be used on the finest turf with advantage and without fear of any damage to the sward.

Read what Mr. S. N. Povey, the Custodian of the Waikaraka Park at Onehunga (which is easily the finest sports ground in New Zealand), says on the 27/2/40 :—

> "Your Harrow has been of inestimable valuc to us in the establishment of our turf. It gives a "clean" cut that can be played on immediately after. It affords the maximum aeration, equalling, in my opinion and experience, 2 cwt. of top-dressing. I consider it "Indispensable Plant."

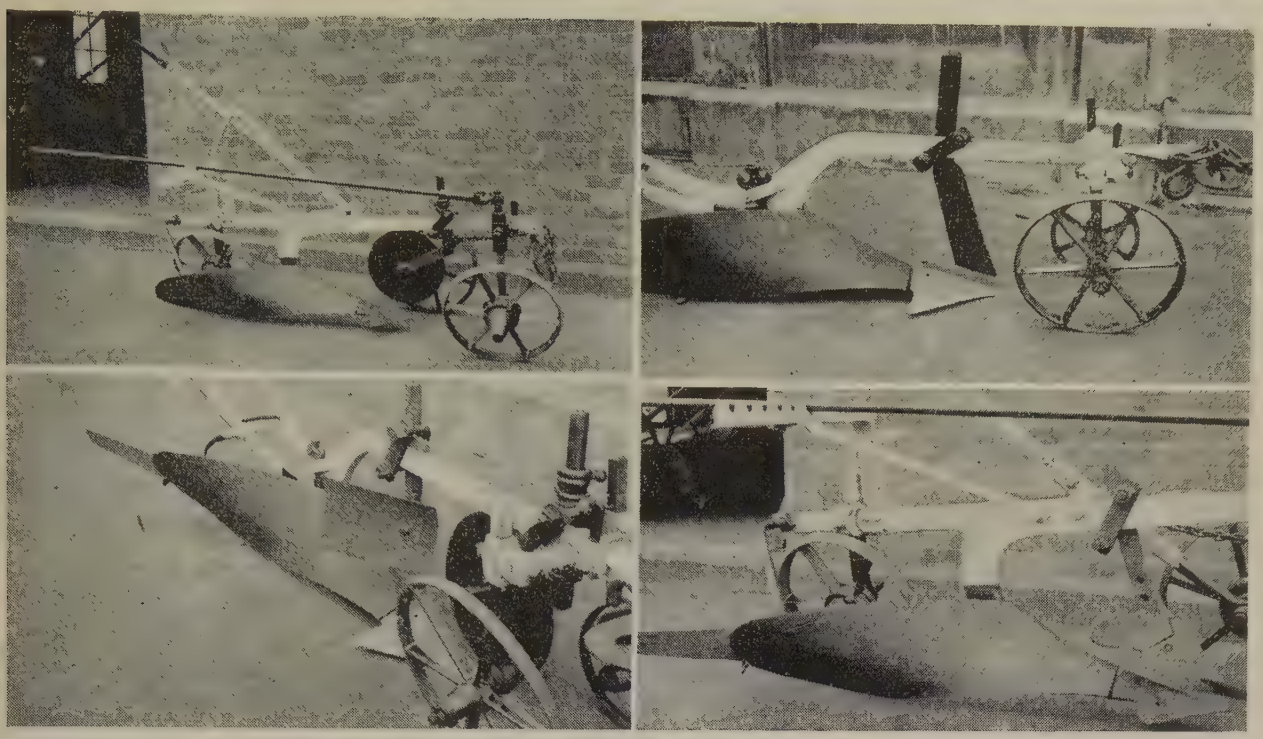
Read what Mr. E. Hutt, the Superintendent of Parks and Reserves for the Lower Hutt Borough Council, says on the 27/10/39 :—

> "The Harrow does splendid work and has already paid for itself several times over in saving of Top-dressing soil.'

I will always be very pleased to supply a harrow to the Department of Agriculture for experimental purposes, preferably to be conducted on the property of a good farmer under actual farming conditions, My price to the Department will be my list price less the same percentage of discount that the Government care to give me off my Income and Social Security Taxation.

Auckland, 22/4/40.

Alister S. Bevin

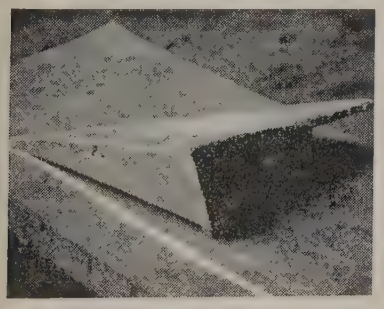


Upper left: Single-furrow lever plough. *Upper right*: Knife Coulter. *Lower left:* Illustrating skimmer and tail-plate extension. *Lower right:* Skim coulter with miniature share (mouldboard type).

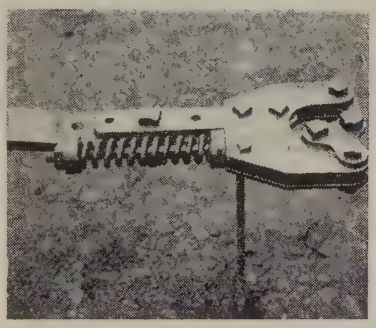
The Share

The type of work performed by a plough depends very largely on the type of share used, and a wide range of share patterns is available for the different classes of work which a plough may be called upon to perform.

For double-breasted ploughs the share used is symmetrical in shape, and may or may not be fitted with broad wings. For subsoiling, the share is symmetrical in shape and tapers to a sharp point. Apart from those used in "digger" ploughs, all shares intended for a general purpose plough have a distinct neck, so that the cutting edge of the share runs well ahead of the mouldboard, and the slice is cut rather than torn from its bed, resulting in a compact and unbroken furrow. In order to function effectively, however, the share must be narrower than the furrow slice, and must not cut the full width of the furrow slice. Otherwise the furrow would be merely pushed aside without being inverted by the mouldboard.



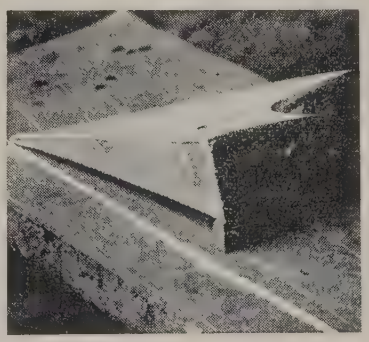
Short-pointed share for ordinary conditions.



Safety coupling.

For work on stony land, a long share with the wing tapering to almost the full length of the share is most suitable, as the consequent wedging action more easily dislodges stones which would otherwise cause damage or obstruction. Where the plough is used for skimming, the wing of the share is sharp and broad, and is carried well back along the mouldboard.

If a high cut furrow is desired, the share used has a somewhat narrow wing tapering to the neck at rather an obtuse angle, and when in action the point of the wing is slightly higher than the point of the share. In this way the slice is cut from the land at an angle somewhat less than 90 degrees. so that, when inverted, the crest of the slice forms an acute angle rather



Long share for stoney land, showing the land and pitch.

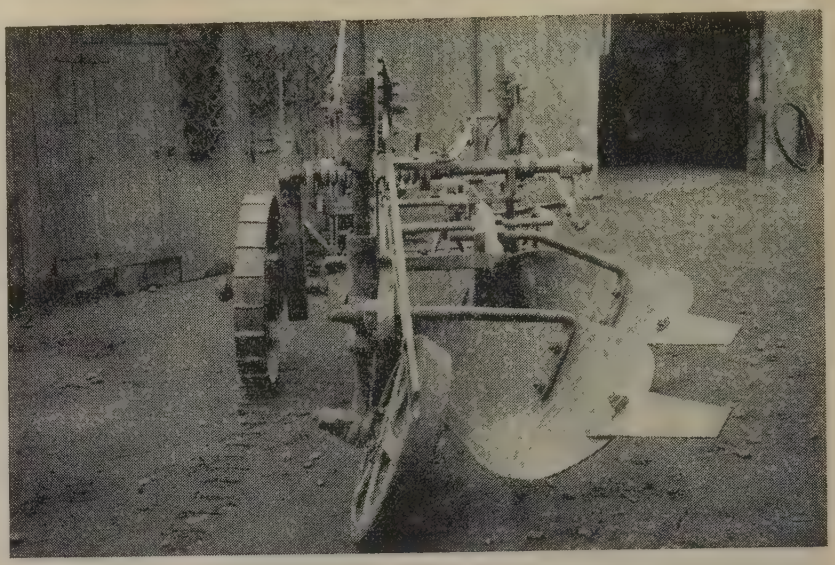
than a right angle as in normal ploughing. In order to level the bottom of the furrow, a scraper is set under the mouldboard to make a horizontal cut along the bottom of the furrow.

Where a square furrow is required, the wing of the share used tapers at a more acute angle to the neck of the share, and the tip of the wing is level with the top of the share, so that the bottom of the slice is cut horizontally, resulting in a rectangular furrow section.

Selection of Shares

The best type of share to be used depends to some extent on the class of land to be ploughed. For land which is hard and stony, special heavy-duty shares are available, but unless these are kept sharp they are thick and heavy in draught. Cast-steel shares possess excellent wearing qualities, but they easily snap on stony ground, and they can be set only by grinding.

Where stone or timber are likely to be encountered, shares of wrought-steel stand up to the work well. When worn, they can easily be re-set and sharpened by hammering at the local smithy. Shares of chilled iron are cheap and serviceable, but they can be sharpened only by grinding. This is the pattern now in almost universal use.



Double-furrow swamp plough, showing solid construction and ample clearance.

Malleable iron shares are of particular value for work where timber or stones are likely to be met. These shares wear quickly in sandy or gritty soils, but possess the advantage that they will not break under any condi-

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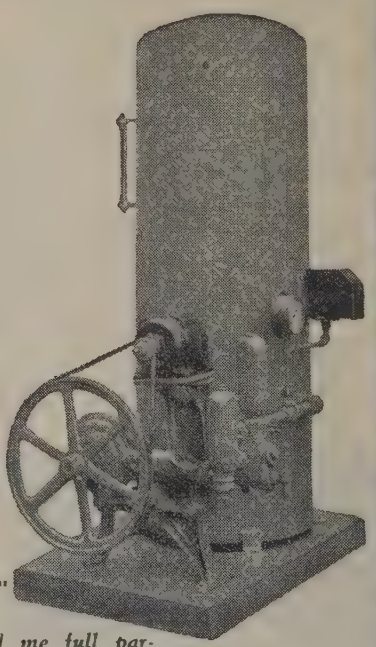

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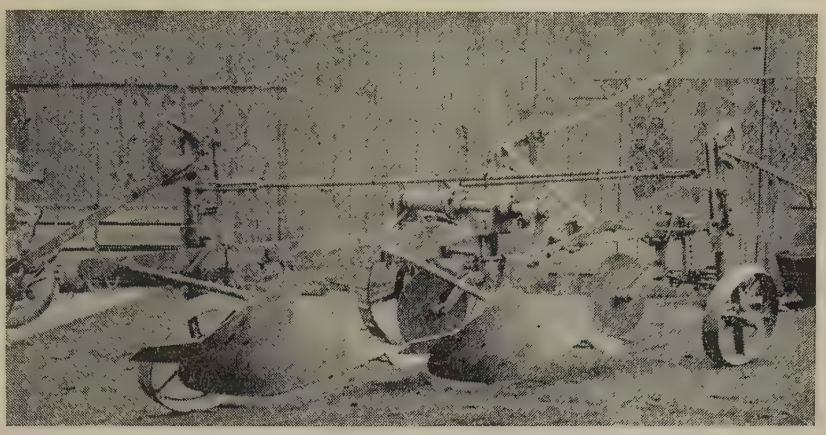
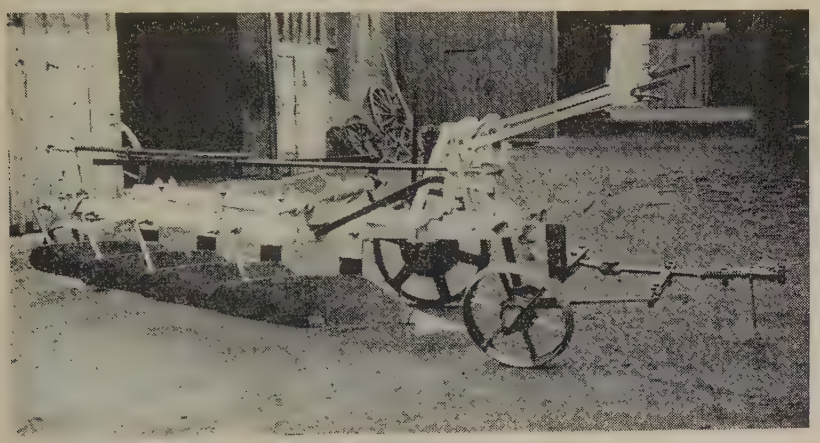
tions of work, and can readily be set cold by hammering the edge down to give more dip.

The Mouldboard

After the furrow slice has been cut vertically by the coulter and horizontally by the share it is gradually inverted and placed in position by the pressure of the mouldboard. In practice, the length and the curvature of the mouldboard exert a very pronounced effect on the type of work performed, and this aspect will be considered later when dealing with the different plough types. In its passage over the mouldboard the furrow slice is turned through an angle of about 135 degrees, so that the original surface is not returned to the horizontal, but lies against the preceding furrow at an angle of about 45 degrees, the greasy face of the slice resting against the earthy bottom of the preceding slice.



Skim coulter and miniature share (mouldboard type).



Multi-furrow tractor plough.

A good mouldboard should present a hard and smooth-grained surface, which will readily take a high earth polish, as this materially affects the quality of the work and the draught required to force the plough through the soil. The metal must be hard to resist wear, and sufficiently strong to resist shock or pressure. Much research and ingenuity have been expended to devise a mouldboard embodying both of these qualities, and the problem of combining hardness and strength has been solved by three different methods:—

(1) Soft-centre Steel.—In these, three layers of steel are fused together, and those on the outside are made very hard to resist wear. The inside layer is made of soft steel to provide a reinforcement capable of resisting shocks and stresses when the plough is in work. Steel mouldboards are excellent in soils free from sand and grit, and under such conditions they take on a high polish and perform first-class work.

(2) Cast-steel Mouldboards.—These are very long-lived and take on a very high polish. The metal is thick, and the mouldboard heavy. As a rule, this type is found only on some American short mouldboard ploughs.

(3) Chilled-iron Mouldboards.—These mouldboards, the wearing surface of which has been specially chilled in the casting process, are extremely hard, and cannot be scratched even by sand. They are particularly suited for work in gritty soils, as these do not impair their scouring properties as they would a steel mouldboard. As the hardened surface is comparatively thick, such mouldboards have a very much longer useful life than the soft-centre steel type.

Four-furrow tractor plough at work.

Classification of Ploughs

In general, the type of work any plough will perform depends very largely on the length and curvature of the mouldboard, and on this basis ploughs are frequently classified as "lea" and "digger" types. This broad classification is in very common use, and will be discussed later. From a descriptive point of view, the various types of plough are best dealt with according to the number of wheels fitted.

(a) Swing ploughs.
(b) One-wheel ploughs.
(c) Two-wheel ploughs.
(d) Three-wheel ploughs (1) colonial pattern, (2) American gang pattern.

Swing Ploughs

This type of plough has no wheels and is used to best advantage for work on stony land or on sticky clay soils where the wheels are likely to clog. The frame or body, which carries the whole of the ploughing parts except the coulter, is bolted to, or forms part of, the beam. The slade or sole plate is attached to the underside of the body and carries the weight of the plough on the bottom of the furrow. Above this on the landside is fixed the landcap, designed to prevent the earth from falling into the furrow.

Having no wheels, the depth and width of the furrow depends entirely on the adjustment of hitch, the pitch and dip of the share, and the skill of the ploughman. In New Zealand, the only swing ploughs in common use are light American patterns with short handles, digger mouldboards, and steel shares.

One-wheel Ploughs

One-wheel ploughs are fitted with a single wheel running in line with the landside. In other respects they are very similar to the swing plough, and can be so converted by removing the wheel. These ploughs are useful on sloping or uneven ground, and most ploughs designed for orchard or garden work or for hillside work are fitted with a single wheel. The wheel can be adjusted vertically to regulate the depth of the furrow, and it also helps to keep the plough steady.

Two-wheel Ploughs

Two-wheeled ploughs fitted with a modified lea mouldboard are very extensively used, and for general utility purposes they cannot be excelled. The two wheels—one in the furrow and the other on the land—regulate the width and depth of the furrow, and greatly reduce the pressure on the slade and the landside.

On land having a fairly even surface and free from obstructions these ploughs perform excellent work. Less skill is required in their operation as compared with the swing plough and the single wheel plough; they are slightly easier in draught, and they impose less strain on the ploughman.

"Lever" Three-wheel Plough

In this pattern handles are dispensed with, and the whole of the weight and side thrust is borne by the three wheels. The wheels, when correctly set, regulate the dimensions of the furrow and guide the plough, so that little effort is required from the ploughman. They are available as single-furrow or multi-furrow ploughs, the two- or three-furrow types being most commonly employed. These ploughs are fitted with a lever working in a quadrant and attached to the land wheel, by which the plough can be earthed or lifted as required. This lever should preferably be draft operated.

As already mentioned, ploughs are frequently classified according to the length and curvature of the mouldboard as "digger" and "lea" ploughs. In practice, the type of work performed by any plough depends largely on

Buying a horse is a job that you do with much care. You endeavour to find out all you can about it, and you use your judgment to the full. When you buy a good horse, you are amply repaid for the time taken and money spent.

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the construction of the coulter, the type of share used, and the curvature and length of the mouldboard. A comparison of typical digger and lea pattern ploughs will show that these three component parts are markedly different.

Digger Plough

The digger plough is made with a short concave mouldboard having a very abrupt twist. The share used is short and has no neck, while the shine of the mouldboard is sharp, and usually performs the function of a coulter in making the vertical cut.

Because of the peculiar body design, the furrow slice is partly cut and partly torn out, and is then turned over at a very abrupt angle, resulting in a well-broken, pulverised, and very loosely consolidated furrow, and leaving the ploughed surface almost level.

The digger plough is not normally fitted with a coulter, but, if necessary, a skim coulter can be attached, and for certain classes of work this will be found almost indispensable. The digger commonly has no wheel, but it is sometimes supplied with one wheel, and models are available fitted with two wheels.

Multi-furrow tractor plough with tractor attached.

The digger plough is not well adapted for ploughing grassland, as weeds and turf, not being covered by a tight, close-fitting, and well-consolidated furrow, do not readily die and decay in the soil. It is seen at its best in ploughing land after fallows, stubbles, or root crops. It should be noted that on the lighter soils where consolidation is of special importance, as in the sowing of grass seed mixtures, the digger is much inferior to the lea type of plough.

The digger plough is widely used for market gardens and orchards, and for this class of work it has a wide range of usefulness, as it is easy to handle on uneven ground or in confined spaces, and is also notably light in draught. The best work is performed on the lighter types of soil, and the fact that the share and mouldboard are frequently made of chilled metal makes this plough particularly resistant to wear on the lighter abrasive soils which cause rapid wear of ordinary steel parts.

Digger ploughs are unsuited for the heavier types of soil, as the earth adheres to the hollow in the mouldboard and prevents scouring. This results in poor work and very greatly increased draught. Double-furrow digger ploughs are satisfactory for certain work on lea land or for turning under weed growth.

Lea or Long Mouldboard

The lea or long mouldboard plough may be regarded as the most highly developed and the most efficient of all ploughs for grassland and, in a modified form, for general utility. The mouldboard is long and gently curving, with the share placed well forward. A coulter is invariably used, and this is generally set to cut in front of or abreast of the share.

The furrow slice is thus cut well in advance of the mouldboard, which, because of its long, gentle slope, gradually inverts the furrow and pushes it into position without causing disintegration. The result is a long, unbroken, well-consolidated, and well-packed crested furrow, which exposes a maximum surface to the weather. For this reason, the lea plough is very commonly preferred for autumn work, particularly where the land is heavy and winter frosts are common.

The lea plough is typically a two- or three-wheel plough; it is easy to operate, but because of the long mouldboard, is rather heavy in draught.

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Three-furrow Riding Plough

The three-furrow riding plough is the common plough for grain-growing districts, where large areas of flat or easy land are ploughed. It is driven by six horses in blocks. The mouldboard is of lea pattern, and the plough is usually fitted with swivel disc coulters and detachable shares.

For ordinary loamy soils, cast-iron shares of the general purpose type are used. In stony land a very strong cast-iron share may be fitted, and where the soil is gritty, a chilled-steel share may sometimes be used with advantage. Furrows are usually about 5 in. deep and 10½ in. wide. The depth of the front and land wheels is regulated by levers operated from the seat.

In the latest models the draught of the horses is used to raise the plough out of the ground. A three-furrow riding plough with lands 25 chains long and furrows 10½ in. wide will plough up to about 5½ acres in an eight-hour day.

Double-furrow Lever Plough

The double-furrow lever plough is the usual type of plough employed on New Zealand farms, and is worked with either three horses abreast or four horses in blocks. The body is very similar to the three-furrow riding plough; a cast-iron share is generally preferred. The plough may be fitted with a subsoiler attachment and a special skim coulter.

Ploughing a 10½-inch furrow 5 in. deep in 25 chain lands, such a plough will cover up to 3¾ acres per eight-hour day.

Digger Double-furrow Lever Plough

The digger double-furrow lever ploughs have sharply-curved, short mouldboards of the typical digger pattern, and the shin of the mouldboard is usually a separate piece of steel made with a cutting edge. The mouldboard is fitted with a tail plate to which knives can be attached for combing the crests of the furrow slices. A skim coulter of the miniature plough type may be employed. This has a steel share with a projecting wing which acts as a mouldboard.

The type of share generally fitted to the plough is made of steel, with a flat wing which cuts the full width of the furrow slice. The point of the share is detachable, and can be fitted to give a variable dip.

Ploughing a 6½ in. furrow 11 in. wide on 25 chain lands with this plough requires six horses in blocks on grass land, and about 3¾ acres will be covered in a day of eight hours.

Single-furrow Handle Ploughs

The general purpose plough of this pattern used in New Zealand has a wrought-iron body, beam and handles, and a long, gently-curved mouldboard. Cast-iron shares are commonly used, and the plough may be fitted either with a swivel disc coulter or a knife coulter. There are two wheels which regulate the width and depth of the furrow slices. This type of plough has been very widely adopted in New Zealand for general purpose work where only two horses are available.

Chilled ploughs of American pattern are commonly used throughout New Zealand. These are of various designs, some having two wheels and some one or none, and are typically represented by the Oliver plough which is made in a very wide variety of models.

The beam may be of wood or iron, but the handles are invariably of wood. The beam is usually short, and small; light ploughs of this description are excellent for ploughing light, steep country where it would not be practicable to use a lever plough or a long-beamed general purpose plough and where the only other alternative would be a hillside plough. In intensive cropping, where narrow headlands are desirable, these ploughs are excellent.

Hillside Ploughs

The hillside plough is useful for steeply sloping ground, as the land can be ploughed continuously across the slopes, beginning at the bottom and working upwards, so that all the furrows are thrown downhill. This obviates any need for setting out lands and the work is completed without leaving open furrows. There are various types of one-way ploughs, but that most commonly used in New Zealand has a symmetrically designed body which can be rotated through an angle of 180 degrees, enabling it to cast the furrow to right or left, as required.

The disadvantage attached to this design lies in the fact that the shape of the mouldboard and share is necessarily a compromise, and is less efficient than the more orthodox design built to plough in one direction only.

Swamp Ploughs

The swamp plough closely resembles the ordinary single-furrow lever type of plough, but it is built on a larger and stronger scale. Because the plough is intended for work on uneven surfaces often carrying tall vegetation, ample beam clearance is provided. As

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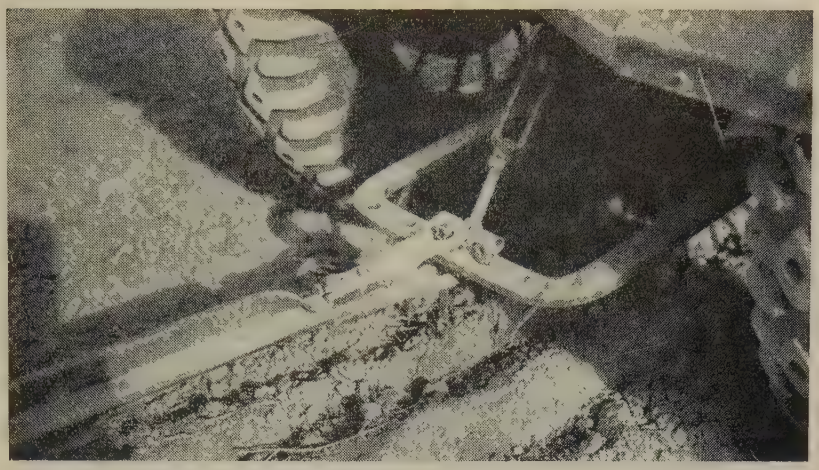
the implement is very liable to encounter buried timber or other obstructions, a stump jump action and automatic release spring-loaded couplings are incorporated as safety devices. Double or even three-furrow ploughs of this pattern are available, if desired.

Disc Ploughs

Radical differences in design are embodied in disc ploughs. A single inclined revolving disc replaces the coulter, share, and mouldboard of the conventional type. The work done by the disc approximates to that performed by the digger mouldboard, the surface being left rough and loose. On soils which are not too hard the disc plough can do satisfactory work, but generally its performance is inferior to that of the ordinary mouldboard plough. Sticky soils in which the mouldboards do not readily scour may be worked more expeditiously with the disc, and when timber or other obstructions are present in the ground the disc plough is sometimes to be preferred.

One disadvantage of the disc plough is the tendency of the disc to leave a portion of the bottom of the furrow unturned. Further, because of their lightness of draught, disc ploughs tend to develop too high a speed when working down a slope, thus causing excessive side displacement of the furrow slices. The reversible disc plough has gained some measure of popularity for hillside work.

When purchasing one of these ploughs particulars should be noted regarding the facilities for adjusting each disc independently. Discs should be easily reversed to give the correct automatic adjustment of each, and the general design should be such as to ensure stability under working conditions. A "stump-jump" action is now provided in the improved makes.



Safety coupling.

Tractor Ploughs

So far as the general principles of construction are concerned, there is little material difference between tractor ploughs and the horse-drawn models. The differences which do appear are mainly concerned with the convenient arrangement of the control levers so that plough and tractor can be operated as a one-man unit. Adequate strength of material and construction and plenty of beam allowance are important features, as this type of plough is usually expected to work at fast speeds and under conditions which impose heavy stresses and strains.

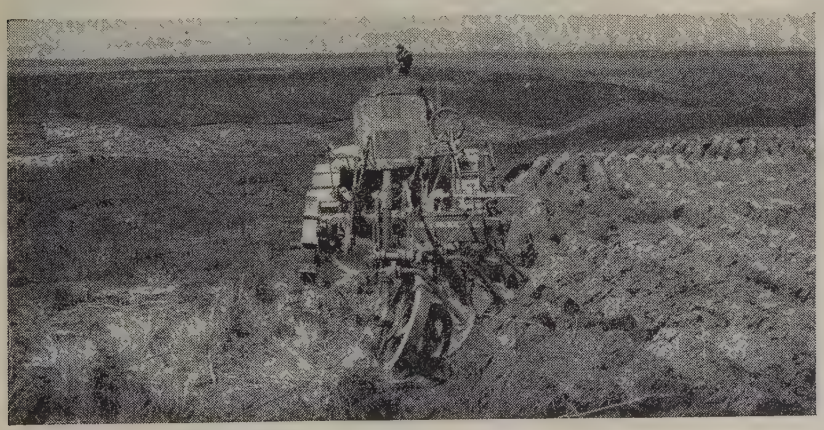
The ploughs are made self-lifting, and special drawbar couplings should be provided to give a wide range of vertical and horizontal adjustment. A spring and pin safety device may be used to advantage where obstructions are likely to be encountered when at work.

Subsoil Ploughs

Where a surface pan restricts proper root development and prevents natural drainage, it can sometimes be effectively broken up by the use of a subsoil plough. Such a plough closely resembles an ordinary plough, but it has no coulter or mouldboard, and is merely fitted with a powerful digging tine under the body. The tine is so designed as to break up the pan without bringing it up to the surface. The subsoiling is performed at the time of ploughing, the subsoiler following in the wake of an ordinary plough, as this allows of deeper penetration and reduces the draught.

Ridging Ploughs

Ridging ploughs are fitted with a double mouldboard, and are commonly used on arable farms to make ridges for root crops and for earthing up potatoes. A marker is supplied, and can be so adjusted as to mark out each return furrow to give a uniform width of drill throughout the field.



Three-furrow swamp plough at work.

Setting the Plough

In the course of its development, much careful thought and experiment have been devoted to the improving and perfecting of plough design, and it may be safely assumed that any new plough is well adapted to perform excellent work under the conditions for which it was designed. If the plough fails to do good work the fault will

usually be found to lie not with the plough but with the user.

To work properly, the line of draught to the plough must pass from the hame hooks through the head of the plough to the centre of resistance on the share. The centre of resistance in a colonial single-furrow three-wheeled plough turning a furrow 11 in. wide and 6½ in. deep in lea land is about 15 in. to the rear of the point of the share, 2 in. up from the base line of the plough (which is a straight line from the point of the share to the tread of each wheel), and 3 in. to the right of the land side of the plough, looking from the rear of the plough. The centre of resistance is not a fixed point; it is constantly on the move from side to side and up and down.

If the bridle is coupled too high—that is, above the true line of draught—the pull of the team will cause the plough to dip and prevent it from cutting a level furrow at its proper depth. This results in poorly-packed furrows, and increases the draught when the ploughman puts his weight on the stilts in an effort to keep to the plough level.

In practice, this fault is often exaggerated, as the weight of the blocks and trees causes a sag in the chain, which tends to make the actual line of draught lower than the theoretical line of draught from the hames. When skim ploughing, the plough rides higher and the centre of resistance is higher, so that if the plough is to perform efficiently the hitch should be correspondingly lowered.

The position of the hitch is of particular importance when a mechanical tractor is used, as the drawbar is frequently set so low that even when the bridle is in the bottom hole the hitch is still too high. This is best rectified by putting an extension to the head with coupling holes projecting downwards to allow the bridle to be attached in the true line of draught. Not only will this result in the plough doing better work, but it will also greatly reduce the fuel bill for the tractor.

Adjustment is provided by means of the bridle, whereby the hitch can be moved horizontally. In practice, this is very commonly attached too far to the right, the intention being to make the plough hold the land. The actual result is to pull the back of the plough away from the land and greatly increase the pressure of the furrow on the mouldboard. For efficient work, the hitch in the bridle should be on the line running from the centre of pull to the centre of resistance.

Setting the Share

In order to make the plough hold its depth a certain amount of dip is given to the share. In some ploughs this can be varied by means of an adjustable foot fitted to the plough, or by the use of packing in the collar to give the share a downward tilt. Some makers even supply shares having an extra dip for work on hard ground. It may be taken as a general rule that any new share, properly fitted, is capable of doing good work. Only the lower edge of the point of the share should make contact with the furrow bottom, and the sole and heel need only be sufficiently high to give proper clearance.

Under normal conditions, the dip should be about ½ in., but this may

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with advantage be increased on hard ground and on hillsides, or when ploughing a deep or wide furrow. If the amount of dip is unduly increased the resulting wear on the point produces an angle of contact which readily forces the plough out of the ground when a stone or hard obstacle is encountered.

Because of the special chilling process used in its manufacture, the soft upper surface wears more rapidly than the hardened bottom surface, and for this reason a properly-set share is self-sharpening. If too much dip is given, however, the pressure—and hence the resulting wear—is concentrated on the underside of the point of the share, and this ultimately results in the soft top edge becoming the cutting edge, while, because of the pronounced bevel on the underside, the share will not hold the ground.

When ground, the share will once more perform good work. Where much ploughing is done, a good emery wheel will quickly pay for its cost, as a sharp share greatly reduces the tractive effort and speeds up the work, and the life of the share can be greatly prolonged.

As a rule, a short share is less easily broken than a longer share, but when a short share is being used it will not penetrate so deeply, and the plough should be let down on the wheel stalks so that it will run level.

The point of the share should also have a slight setting towards the land to offset the continual tendency of the front of the plough to work over towards the ploughed ground. If this tendency is corrected solely by adjusting the brindle pin and not by providing pitch to the share the pin will have to be moved so far that it will cause the rear of the plough to swing away from the furrow wall.

Illustrating a bad finish.

If a plough frequently breaks shares at the sockets the breakage is often due to the foot having been worn away through allowing it to drag on the road when moving the plough from field to field. This causes the socket of the share to fit loosely, and a sudden shock readily pushes it so far on to the foot that it wedges the socket open.

Setting the Coulter

The best position for a knife coulter depends to a great extent on the conditions of the land being ploughed. On soft ground the knife can be set almost vertically, while if the land is hard the coulter will penetrate more easily if the point is sloped well forward. This setting is also desirable for weedy or rubbish and straw-covered ground. Where obstructions are likely to be met, the coulter can be set to protect the share by moving it forward along the beam and sloping backwards, with the point dropped below and in front of the share. This causes the plough to rise if it encounters a heavy obstruction.

In good ploughing lea ground little slope should be given, and the point should be set slightly in advance of the stem. For normal ploughing, the point of the coulter should be directly over or level with the point of the share, with a slight cut to the land. This latter helps to hold the plough to its work on hillsides or hard ground. Sufficient clearance should be allowed between the coulter tip and the share point to permit the free passage of ploughed material.

When a disc coulter is used it should be given ½ in. or 1 in. of clearance above the point of the share, with the stub of the axle about 3 in. back from this. On hard or stony land greater clearance may be given, or the coulter may be moved further back and more "dip" used. For grassland or twitchy land, the coulter is best moved forward and lowered. Where timbers or other obstructions are likely to be encountered, a large disc set to cut below the share point should be employed.

Where an under-cut furrow is desired, the coulter should be inclined slightly to the land. Land so ploughed can be more easily consolidated, and harrowing on the narrow angle of the crested furrow slices is more effective. A skim coulter attached to the beam of the plough and working in advance of the normal share is of great value in completely burying surface vegetation and rubbish which would otherwise interfere with subsequent cultivation. The setting for this depends

"The last furrow" of an excellent piece of ploughing.

on the type employed, and is best performed by trial and observation when at work.

Care of Mouldboard

When properly fitted, the mouldboard requires no further adjustments, and it should not be altered after purchase. The practice of widening the mouldboard by altering the stays does not result in better packing of the furrows, but merely results in increasing the draught of the plough. It should be noted that excessive wear on the breast frequently results when the coulter does not completely cut the furrow or is set too far back.

Sharp turns at the end of the feering impart heavy side strains, and damage may result through its being bent out of place. This particularly applies to the front mouldboard of a three-furrow plough. This can be prevented by turning a few times on the next land until sufficient ground has been ploughed to permit easy turning.

It should be remembered that the draught of a plough and the quality of its work depend largely on the polish of the mouldboard. For this reason, the surface should be protected by a light greasing when the plough is laid up. The grease should be applied evenly with a cloth. When the tail edge of a mouldboard is worn thin and sharp it should for safety be turned over with a hammer.

Setting the Wheels

The wheels of a plough turn thousands of times in ploughing an acre of ground. Unless kept well lubricated, wear is rapid and the axles quickly become loose, this being frequently accelerated by a faulty hitching giving a wrong line of draught. When the axles are badly worn the plough will not steer, the land wheel pulls to the land, and the back wheel allows the legs of the plough to drag against the unploughed land, so that they quickly wear. The result is to increase greatly the draught of the plough. When badly worn, the axles and face plates should be renewed. Heavy draught and increased wear quickly result if the wheels are not so aligned as to run parallel with the furrow.

On a three-wheel plough the front and back wheels should be on the same level as the point of the share. The correct setting can be ascertained by the marks made in the wheel stalks above the shackles for this purpose. Raising the wheels to give more "dip" does not help the plough to hold the ground, but merely results in bad turning and uneven furrows.

The back wheel should be altered only for transport, but on loose soil where the edge of the furrow falls in and prevents the front wheel from reaching its proper level this may be slightly raised to keep the plough level and the furrows even. Care must be taken, however, to see that the wheel still exerts sufficient pressure on the bottom of the furrow to keep the plough steady.

As the draught of the plough depends to a great extent on the true running of the wheels, they should be lubricated freely and the sand washers kept in good condition. Graphite added to the oil greatly improves its quality as a lubricant for this purpose, so that even when "dry" for short periods, little harm will result.

Transporting a Plough

When a plough is being transported the "feet" should be clear of the ground. No provision is made for wear at these points, and should it occur, difficulty will be experienced in fitting the shares, and broken sockets may frequently result.

For a single-furrow handle plough a hardwood skid or runner can be employed. This is fitted to the front after the share has been removed. The "feet" on lever ploughs can usually be given sufficient clearance by lowering the wheels. The practice of tying a wheel so that it may act as a brake is to be condemned, as a wheel so fixed wears flat and thin in places and becomes greatly weakened.

ATTENTION is drawn to an advertisement appearing in this issue relating to facilities available to farmers for obtaining loans on the security of stock and chattels under the provisions of the Rural Intermediate Credit Act. The administration of the Act has been entrusted to the State Advances Corporation, which invites farmers who are desirous of securing financial assistance for productive purposes to address any inquiries for further information to the nearest office of the Corporation, or to the Office of the Secretary of any Rural Intermediate Credit Association established under the Act.

RAILWAY BOOKING FACILITIES

Full Service at all Officered Stations

All officered stations, including those beyond the cities, have complete facilities for booking tickets on all trains and on the inter-island express steamers, and for the reservation of seats, sleepers, and steamer berths. Any intending passenger's needs are efficiently met.

Take advantage of the satisfactory service available at the station in your town. Check your luggage the day before you travel.

Reliable Service at Your Station

Instructors gathered together on the trial plots at Dunedin.

Improvement of Seed Potatoes

Most Feasible Approach Offered By "Selection Block"

J. O. WALLACE, Fields Instructor, Dunedin.

UNDER normal farm practice potato stocks degenerate or "run-out," and while this occurs more rapidly in some districts than in others, the chief underlying cause is invariably the same—that is, the spread of seed-borne diseases categorically known as viroses.

Infection with potato virus adversely affects the yielding capacity of the plant, but it does not cause any wastage in the crop by bringing about a decayed condition in the tubers, and for this reason its full significance is not realised by many commercial growers.

Up to the present no method has been discovered by which the presence of the disease can be detected in the tuber alone; in fact, seed tubers of excellent appearance may be heavily infected and consequently worthless for the production of maximum yields.

Infected plants usually develop abnormalities in the haulm and foliage. Consequently, it is essential to inspect crops in the field during the growing stages to determine the value of the seed that might be retained from them in regard to its yielding capacity.

The only way to avoid virus diseases in potatoes and the consequent loss in production is to use seed reserved from healthy plants. In an endeavour to improve potato stocks the most feasible approach by the grower specialising in the production of seed potatoes is by the "selection block."

Types of Virus

The two principal types of virus to be contended with are commonly known as leaf roll and mosaic respectively, the names giving a ready description of the abnormal condition of above-ground growth of plants infected with these types of virus.

Virus disease is systematically progressive, and in some localities or under certain climatic conditions it can spread very rapidly. The tubers carry the disease, and thus those reserved from an infected plant will produce diseased plants the following year. As infected plants produce a preponderance of seed-size tubers compared with healthy plants, seed saved from a crop with only a moderate infection can develop a greatly-increased percentage of diseased plants in the succeeding crop.

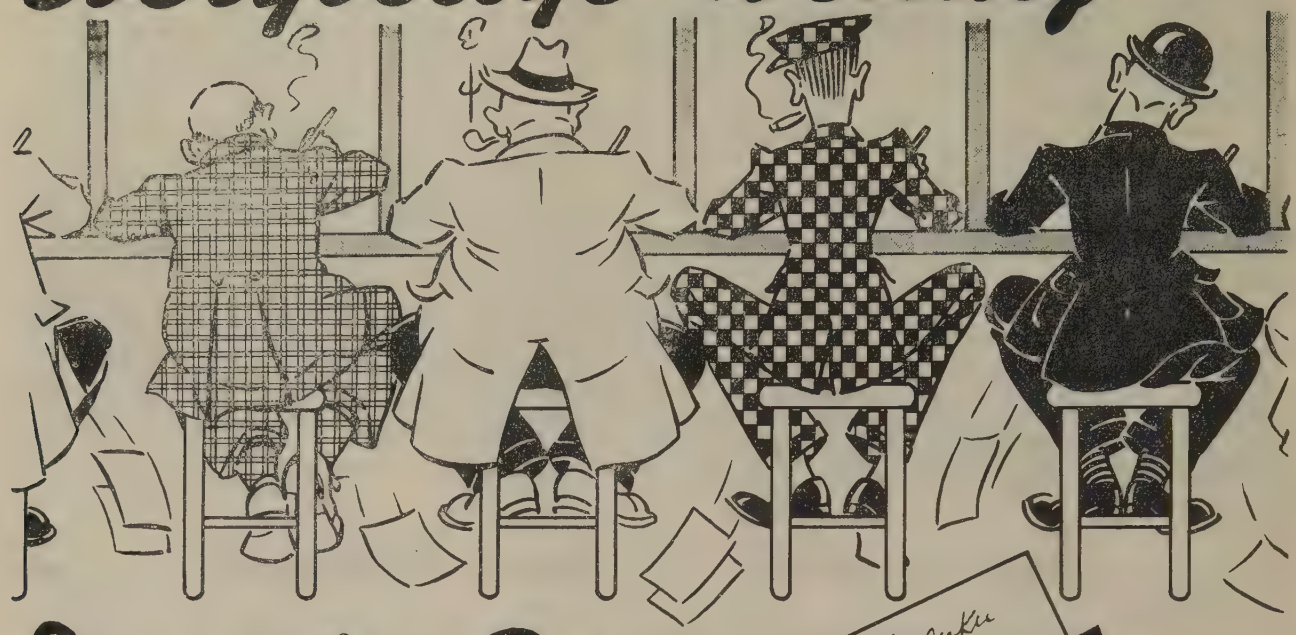
Virus diseases can also be transmitted from plant to plant in the field. In some types of virus, particularly leaf roll, leaf-biting insects (mainly aphis or green fly) behave as the transmitting agents. In other types, contact between diseased and healthy plants may be the main or only means of transmission.

Scope for Improvement

No cure has been found for virus diseases, and the only way to avoid them and the consequent loss in production is to use seed reserved from healthy plants, and while the Seed Certification Scheme has achieved much since its inauguration to make available to growers seed relatively free of these insidious diseases, there is still scope for further improvement in commercial stocks generally.

Efforts expended in the raising of extra high quality seed potatoes should bring its own monetary reward, as

Everybody's writing—



Dear Mr Bevin—

Waimauku
25/9/39

Dear Mr Bevin

I purchased a set of your Harrows two years ago and they have proved a splendid investment. With manure, and liberal use of the "Bevin" Harrow, the transformation of sickly and impoverished pastures has been remarkable. Although the 1938-39 season was definitely against production, my cows produced 2000 lbs. of butterfat more than in the previous season. The proof of the Harrow is the work it does—four of my neighbours are now using "Bevin" Harrows.

Yours faithfully
F. W. Baker

The "Bevin" Harrow has many points of advantage over all other makes. It is sold on a complete satisfaction (including results) or money back guarantee.

(Mr. Baker is only one of the many hundreds who, by using the "Bevin" Harrow, increased their production during an adverse season).

Your initial move to try out the "Bevin" Harrow for yourself is to send for particulars which this convenient coupon will bring you without obligation.

Mail this Coupon

To ALISTER S. BEVIN, Dept. "J,"
38 Albert Street (Box 880), Auckland.

Without obligation please send me full particulars and illustrations of the "Bevin" Harrow. Also a copy of your written warranty.

NAME ... .

ADDRESS ....

.....J.A., 15/5/40

Try out a BEVIN HARROW yourself

there is a constant keen demand for the higher classes of certified seed.

In an endeavour to improve potato stocks the most feasible approach by the grower specialising in the production of seed potatoes is by the "selection block." It is obvious that to rogue or cull a large field of weak or diseased plants would entail much time and labour. Also, very often diffidence to the removal of slightly affected plants influenced by the thought that much good commercial produce was being wasted would result in the non-removal of such plants, which would thus remain to produce diseased seed for next year's planting.

Selection Block

The "selection block" method involves the growing of a relatively small area planted with the best foundation stock obtainable specifically for the purpose of supplying sufficient tubers to plant the main crop in the following season. The best certified seed is recommended for foundation stock, but should this not be procurable, nucleus material could be reserved from selected plants marked in the main crop during the growing period. No plant should be marked unless the neighbouring plants are perfectly healthy, and no seed should be reserved from a marked plant unless the yield is entirely satisfactory and the tubers of good shape.

Plants showing virus disease. *Left:* Mosaic may be distinguished by a mottling and crinkling of the leaves, which are smaller than those of a healthy plant. When the plant is shaded from the sun the mottling becomes more evident. In severe attacks the whole plant appears pale in colour on account of the pronounced mottling. *Centre:* A healthy plant. *Right:* The lower leaves of the leaf-roll-infected plants are seen to be rolled upwards and become funnel-shaped. The leaves are harsh and brittle to the touch. Infected plants generally are smaller and the foliage of a lighter colour.

Variations in yield which have actually been obtained when samples of seed from different lines were grown side by side under uniform conditions. The figures represent tons per acre of table potatoes. The cost of production in all cases was the same, but the difference in yield between the two worst and the two best was fully 7 tons per acre.

The seed obtained will be the basis of the selection block, and it is highly desirable that it be grown under isolated conditions, that is, as far as possible away from all other potato crops. The worst place, particularly in a district where insect life is abundant and spread of virus disease is rapid, would be alongside or in the middle of the commercial crop. Certainly, if more than one variety is grown, each variety, particularly in the selection block, should be widely separated.

Growers in unfavourable districts would probably be best advised to purchase fresh certified seed regularly rather than to atempt to maintain the standard of their crops by intensive rogueing and selection.

A selection block in the Southern Bush District.

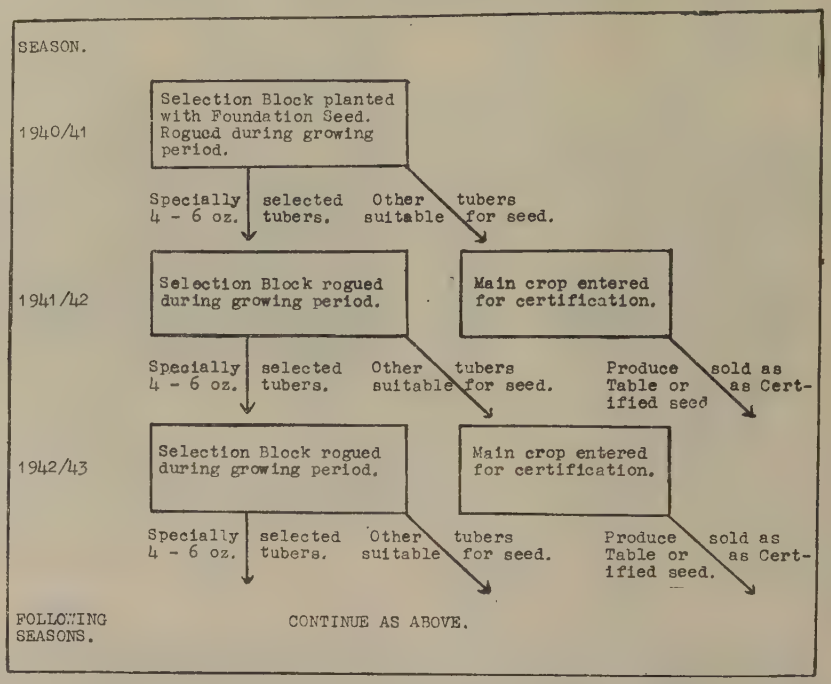
Selection of Tubers

The area of the seed plot should be relatively small—one-half to one acre would meet most requirements—as it has been found that, with an area of this size, rogueing or culling of diseased plants is carried out more thoroughly. A careful inspection of all the plants should be made at least twice (and preferably more often) when plants slow to come away, those showing symptoms of virus disease, or those abnormal in any way should be removed entirely and burnt.

The first rogueing should take place as soon as any weak plants can be definitely distinguished, and should be repeated as long as there are any further plants to remove. It is advisable to harvest the crop by hand fork, as the produce from each plant can then be separately examined. When the yield of a plant is low, the tubers are unshapely, or other abnormal conditions are exhibited the total produce from the plant should be discarded.

A further selection of tubers is made from the produce retained to plant the following year's selection block, and in doing this, average-size tubers of about 4 to 6 ounces showing typical varietal characteristics and free from skin disease should be reserved. The rest of the produce is used for sowing the main crop for the production of certified seed.

DIAGRAM SHOWING THE PROCEDURE WHEN USING A SELECTION BLOCK.


SEASON.
1940/41
Selection Block planted with Foundation Seed. Rogued during growing period.
Specially selected 4 - 6 oz. tubers.
Other suitable tubers for seed.
1941/42
Selection Block rogued during growing period.
Main crop entered for certification.
Specially selected 4 - 6 oz. tubers.
Other suitable tubers for seed.
Produce Table or as Certified seed
sold as
1942/43
Selection Block rogued during growing period.
Main crop entered for certification.
Specially selected 4 - 6 oz. tubers.
Other suitable tubers for seed.
Produce Table or as Certified seed.
sold as
FOLLOWING SEASONS.
CONTINUE AS ABOVE.

Suitable Locations

The commercial production of high-grade seed potatoes will to a very large extent be governed by the prevailing climatic conditions in the various districts. Localities having a warm, humid climate where leaf-biting insects are generally abundant are not at all suitable; in fact it is doubtful whether any marked improvement could be made, but the use of the selection block would nevertheless help in retarding the rate of degeneration.

The more suitable locations are in the colder districts where winds are frequent and where potato-growing is normally of secondary consideration to the farmer. The commercial crops in these localities are, as a rule, fairly healthy, and as insect life is scarce the transmission of the disease and rate of degeneration is slight. The most suitable natural localities for improved seed production work are the coastal bush districts of Otago and Southland and parts of the high country in Canterbury and the North Island.

Already a number of seed potato growers have been successful in putting into practice the methods outlined. The advice and practical assistance of officers of the Fields Division are available to those farmers who are prepared to adopt these methods in respect to their own crops.

Grading Seed Potatoes To Comply With Certification Standards

E. G. SMITH, Fields Instructor, Christchurch.

BEFORE the provisionally certified potato crop can be finally certified the tubers require to be graded to certain standards. To the experienced producer of certified seed, the grading of the tubers to the desired standards should present few difficulties, but there are occasional farmers who do not appear to appreciate that care should be taken to avoid damaging the tubers when grading. Various rots cause considerable loss in potatoes after digging, and as these diseases attack tubers which have been even slightly bruised at the time of digging or grading, it will be realised that careful handling is necessary.

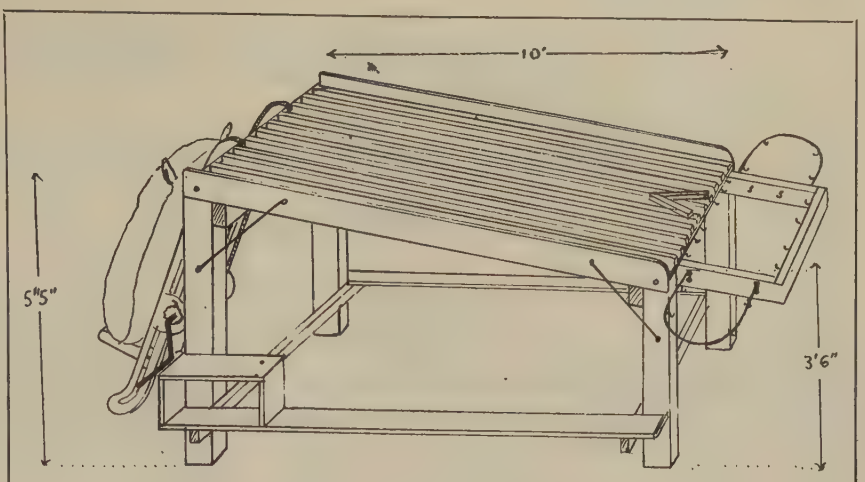
There are various methods of grading the seed. Hand-sorting from pits or bags is a common practice, and results in little or no damage to the

tubers, but this method, although satisfactory in many respects, is comparatively slow, and therefore speedier methods are often resorted to. In most cases, the ordinary mechanical grader has proved unsatisfactory because of damage caused by the wire riddles with which these machines are fitted.

The grading table or the revolving canvas apron, as shown in Figs. 1 and 2 respectively, are now finding favour with a number of growers of certified seed. With either of these last-mentioned methods grading may be carried out with a minimum of damage to the potatoes.

Using the Table

In using the grading table a sack of potatoes is raised by means of the hoist and is tipped on the upper end of the table. Standing on platforms on either side of the table, the pickers take off any tubers which are not to be included in the sample to be finally certified, and allow the remainder to pass on down into sacks attached to the lower end of the table. One distinct advantage of this method is that as the potatoes roll from back to front of the table the whole surface of each tuber may be seen.



A Sketch of a Grading Table.

The canvas apron with hopper attachment shown in Fig. 2 is usually operated by hand. The potatoes are placed in the hopper, from which they pass out on to the canvas, a turn of the handle bringing them forward as

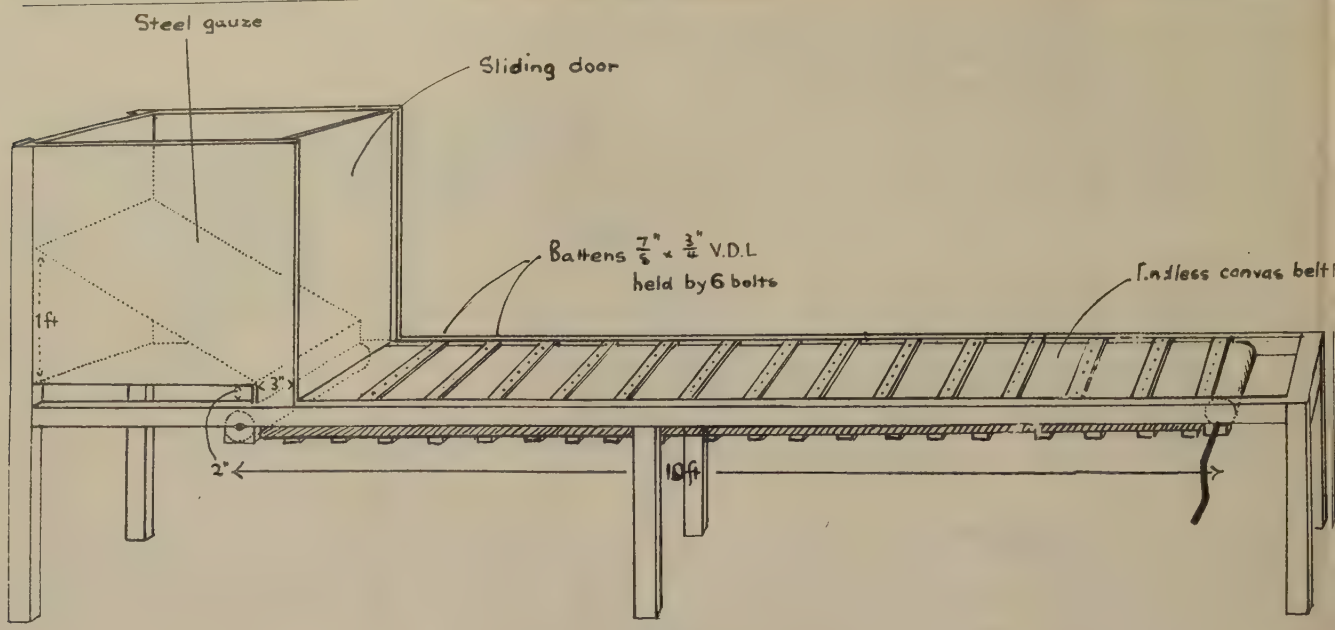
WRITE IN NOW FOR FULL DETAILS OF THE "RELIROB"

The "RELIROB" POTATO-SORTING TABLE

Ideally suited to Government Certified Seed Potatoes, especially Sutton's Supreme; and keeps potatoes absolutely free from damage. The "Relirob" makes the job of grading seed into sizes required for certification simplicity itself, while the hoist, which eliminates lifting is so easy that a boy can operate it. The "Relirob" is specially constructed to save the energy of the men sorting.

R. G. ROBINSON LTD.

SEED POTATO SPECIALISTS - - PAPANUI (Box 4), CHRISTCHURCH.



A Sketch of a Revolving Canvas Apron.

required. The good tubers are picked off and placed in sacks attached to one side of the machine, while rejects pass on into sacks at the end of the apron.

Whatever method is used, the work must be carried out with great care if satisfactory results are to be obtained.

Selection

Foreign varieties, damaged and misshapen tubers, or those affected by blight, eelworm, scab, or other defects should be discarded, and the graded seed should be put into good, sound sacks. A small percentage of material which should go into the discard will, at times, escape the notice of the most careful grader; therefore, the careless grader, be he experienced or otherwise, will probably find that his sample does not come up to the requisite standard.

Certified seed potatoes must also be evenly graded in regard to size, while tubers below 2 ounces in weight cannot be tagged as certified seed.

The following method is employed to determine whether the tubers are evenly graded. At tuber inspection at least one sack in six is opened, with a minimum of eight sacks in any one line. Twenty-five tubers are taken from each sack opened, and the tubers grouped in lots of one hundred. From each of these lots of 100 tubers the largest 16 and the smallest 16 are weighed for grade, and the average weights of the largest and smallest lots respectively are stamped on the tags issued.

The following table shows the maximum range in grade which can be allowed.

TABLE TO DETERMINE MAXIMUM RANGE IN GRADE.
(All figures represent lbs.)

Smallest 16 ..	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0
Largest 16 ..	4.3	4.5	4.8	5.0	5.2	5.5	5.7	6.0	6.2	6.4	6.7
Smallest 16 ..	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2
Largest 16 ..	6.9	7.2	7.4	7.6	7.9	8.1	8.4	8.6	8.8	9.1	9.3
Smallest 16 ..	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	8.2	8.4
Largest 16 ..	9.6	9.8	10.0	10.3	10.5	10.8	11.0	11.2	11.5	11.7	12.0

In practice farmers find it convenient to make the following approximate grades: (a) 2.2—4.0; (b) 3.8—5.8.

Storage of Potatoes.

TOO often scant attention is given to the storage of potatoes after they have been lifted, resulting in loss to the grower and disappointment to the purchaser.

When pitting potatoes in the dryer districts, they should first be covered with straw, and then with earth. In sandy ground much labour will be avoided by sinking the pit a little below ground level. Loosen the ground along the line of the pit by a plough to the requisite length and width, and from this throw the soil to the sides, where it is handy for the subsequent covering of the heap. As the crop is carted in, the drays are backed endways to the side of the pit and the load tipped in.

In wet districts such a plan is impossible, as the clamp would become waterlogged. It thus must be built above ground level, a trench being excavated afterwards along each side to provide soil for covering the potatoes, at the same time carrying off water. A well-built pit of potatoes should be about 4ft. to 6ft. wide, and the sides should be sufficiently sloped to throw off rain. If the crop is sound and dry wider pits can be built, but the all-important thing is to build them well to keep out frost and moisture.

Seed Potato Certification

List of Provisionally Certified Growers For Season 1939-40

Contributed by the FIELDS DIVISION.

PROVISIONAL certificates are issued with the object of affording growers some indication of the general standard of their crops and assisting them in the disposal of their seed. Certification tags to be attached to the sacks are issued later, provided that an officer of the Department of Agriculture inspects the graded seed potatoes and is satisfied that they are still of the same standard of purity and freedom from disease as was indicated by the field inspection.

Each crop has received a group number, which indicates as accurately as possible the merits of its produce for seed purposes in relation to the merits of the produce of the other provisionally certified crops of the same variety. Group 1 is the highest and Group 8 the lowest. The difference between any two consecutive groups is small, and in making comparisons the cost of seed and transport should receive consideration.

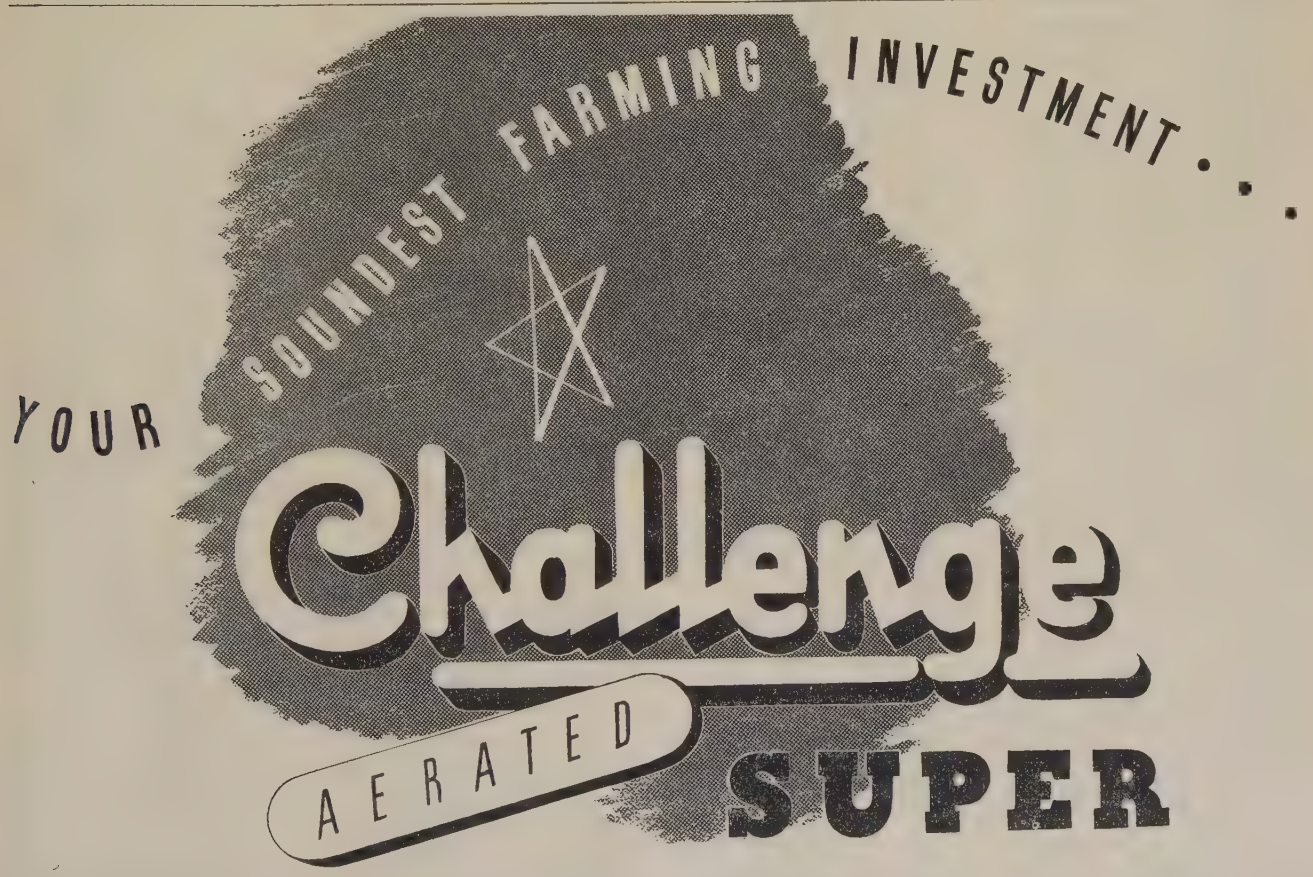
Crops are also divided into two classes—namely, (1) certified "mother" seed; (2) certified "commercial" seed. Areas sown with certified "mother" seed are eligible for entry into certification. Areas sown with certified "commercial" seed are not eligible for entry into certification, except in the case where the seed planted has been raised by the entrant (grower) himself. Growers who intend to purchase seed with the object of entering certification must therefore purchase certified "mother" seed.

List of Growers.

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
AUCKLANDER SHORT TOP.			
Mother Seed (North Island).			
Deadman, G. T., Ohakune ..	2	0.1	6
Deadman, J. E., Ohakune ..	3	0.5	8
Horne, R. P., Ohakune ..	2	0.1	3
Larsen, A., Ohakune ..	2	—	3
Mountfort, A. G., Ohakune ..	2	0.4	3
Read, A. G., Ohakune ..	2	0.2	4
Toland, W. H., Ohakune ..	2	—	3
Mother Seed (Canterbury and Marlborough)			
Adams, K. & R., Sheffield ..	3	0.5	3
Allen, A., Killinchy via Leeston	2	—	3
Annand, A. B. & Co., Timaru	2	—	5
Appleby, R., Levels	2	—	5
Barnet, R., Dunsandel (Line A)	2	—	5
Barnet, R., Dunsandel (Line B)	2	—	5
Basher, W. F., 167 Hawthorndon Rd., Riccarton, Ch'ch.	2	—	4
Baxter, S. D., R.M.D. Kerrytown	3	—	1
Bell, H. R., Sandy Knolls (Line A)	3	0.5	4
Bell, N. T., Southburn, Timaru	3	—	1
Bennett, W., Springston R.M.D.	2	—	3
Benny Bros., Southbridge R.M.D.	3	—	2
Blackwood, J. R., Sutherlands	2	0.3	2
Boyle, A. D., Orari	3	—	1
Breakwell, A. J., Tinwald (Line A)	2	—	5
Breakwell, A. J., Tinwald (Line B)	2	—	5
Breen, J., Levels (Line A) ..	3	0.3	2
Breen, J., Levels (Line B) ..	2	—	2
Breen, M., Levels	2	—	2
Breen, W., Levels	3	0.3	3
Brick, P., Mt. Hutt R.M.D Rakaia	2	—	4
Brosnahan, Mrs. H. M., Rangitira Valley, Temuka ..	2	—	2
Brosnan, J. J., Kerrytown R.M.D.	2	—	1
Bulmer, W. O. & J. R., Darfield R.M.D.	2	—	6
Burns, T., Levels	2	—	2
Cain, W., Seadown, Timaru	3	—	2
Campion, C. A., Mt. Hutt R.M.D., Rakaia	2	—	2
Carroll, J., Southbridge ..	3	—	3
Carroll, T. F., Southbridge ..	3	—	7
Cartwright, A. H., Pleasant Point (Line B)	3	—	1
Cattermole, L. W., Box 15, Temuka	3	0.2	1
Chalmers, G. C., Rangitatta ..	3	0.2	3
Chappell, L. J., Killinchy R.M.D. Leeston	3	—	2
Chappell, T., P.O., Yaldhurst	2	0.2	6
Charles, A. & Son, Coalgate (Line A)	2	0.2	1
Charles, A. & Son, Coalgate (Line B)	2	0.2	3
Chatterton, C. S. Dunsandel	2	—	3
Chatterton, L. J., Dunsandel	2	—	3
Chatterton, W. V., Dunsandel	2	—	5
Coppard, E., Yaldlhurst ..	3	—	2
Crawford, J. A., Pound Rd., Yaldhurst (Line A) ..	2	—	7
Crawford, R. T., Pound Rd., Yaldhurst (Line B) ..	3	—	8
Cross, A. E., Bennetts, via Rangiora	2	—	1
Crossman, G. & E., Milford, Temuka	2	—	1
Crozier, W. J., Mt. Hutt R.M.D., Rakaia (Line A)	1	—	3
Crozier, W. J., Mt. Hutt R.M.D., Rakaia (Line B)	1	—	7
Currie, W., Winchester ..	2	—	1
Curtis, J. J., Pound Rd., Yaldhurst (Line A) ..	3	—	2
Davidson, W. M. G., c/o Mrs. J. Kelman, Timaru-Temuka R.M.D. (Line A)	3	—	5
Davidson, W. M. G., c/o Mrs. J. Kelman, Timaru-Temuka R.M.D. (Line B)	2	—	3
Davidson, W. M. G., c/o Mrs. J. Kelman, Timaru-Temuka R.M.D. (Line C)	3	—	3
De Renzy, J., Winchester (Line A)	2	—	5
De Renzy, J., Winchester (Line B)	2	—	1
Donehue, L. G., Kohika R.M.D., Timaru	3	—	2

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
Elliott, D., Albury	3	—	1
Elworthy, A. S., Holme Station, Timaru	3	—	2
Ford, B. A. C., Christchurch, Greendale R.M.D.	2	0.3	18
Forestdale Sheep Farming Co., Box 567, Christchurch	2	—	2
Franks, L. J., 88 Russley Rd., Upper Riccarton (Line B)	3	—	3
Fraser, J., Levels Valley Tycho R.M.D.	2	—	1
Galletly, J. A. & N., St. Andrews	2	—	4
Gardiner Bros., Upper Waitohi, Temuka	3	—	8
Gibson, H. J., Seadown R.M.D.	3	—	3
Giles, N. J., P.O., Temuka	2	—	3
Gillett, G. N. H., Koromiko, Marlborough (Line B)	2	—	2
Gould, H. J. Pleasant Point	2	—	1
Gray Bros., St. Andrews (Line A)	3	—	10
Gray Bros., St. Andrews (Line B)	3	—	5
Gray Bros., St. Andrews (Line C)	2	—	3
Gray, J. L. "Bankfield," St. Andrews	3	—	3
Gray, P. B., Hadlow-Tycho R.M.D.	3	—	10
Green, J., Timaru - Tycho R.M.D.	2	—	3
Hawkins, A. T., Sheffield R.M.D.	2	—	1
Hayes, G. B., Halkett R.M.D.	2	—	1
Hegan, M., Southbrook, Rangiora	3	0.2	7
Henderson, J. L., Te Ngawai Rd., Pleasant Point	2	—	3
Hewson, Mrs. M. S., Orari	2	—	3
Hill Bros., Pareora West	2	—	4
Hulston A. J., West Melton Greendale R.M.D.	2	—	2
Hussey, C. A., 310 Sawyers Arms Rd., Harewood	3	—	6
Innes, T. S., Sheffield (Line A)	2	—	2
Innes, T. S., Sheffield (Line B)	3	0.2	4
Jelley, J., Russley Rd., Riccarton (Line A)	3	—	6
Joblin & Welburn, Darfield	3	0.3	8
Johnston, W., Rakaia	2	0.3	3
Kelliher, J., Albury	1	—	2
Kelliher, T., Pleasant Point	1	—	6
Kelly, D., Willowbridge (Line A)	3	—	10
Kelly, D., Willowbridge (Line B)	3	—	12
Kelly, D., Willowbridge (Line C)	2	—	4
Kenyon, F., Rangiora	3	—	2
King, G. H., West Belt, Rangiora (Line A)	3	0.3	6
King, G. H., West Belt, Rangiora (Line B)	3	—	5
King, H., c/o G. H. King, West Belt, Rangiora	3	0.2	4
King, J. C., Tycho R.M.D., Timaru (Line A)	2	—	2
King, J. C., Tycho R.M.D., Timaru (Line B)	2	—	1
King, W. H., Rosewill, Timaru (Line A)	2	—	1
Kingsbury, G. E. R. South R.D., Timaru	3	—	2
Lamb, Mrs. A., Christchurch-Greendale R.M.D. (Line A)	2	—	2
Lamb, Mrs. A., Christchurch-Greendale R.M.D. (Line B)	2	—	1
Lang, H., Amberley (Line A)	2	—	3
Lang, H., Amberley (Line B)	3	0.6	2
Leathwick, A., Hook R.M.D., Waimate	1	—	5
Lister, S. J., Milford, Temuka	2	—	1
Lord, J. & Son, Kaiapoi R.M.D. (Line A)	2	—	6
Lord, J. & Son, Kaiapoi R.M.D. (Line B)	2	—	2
McAuley, A. L., Kimberley R.M.D.	2	—	2
McCully, J., Seadown R.M.D.	2	0.2	6
Macdonald, J. E., "Corra Lynn," Fairlie	2	—	1½
McKenzie, R., Cave	3	—	2
McLeod, J. A., Tycho R.M.D.	2	—	1
McPhail, W. A., Mitcham, via Rakaia (Line A)	1	—	5
McPhail, W. A., Mitcham, via Rakaia (Line B)	1	—	9
McRobb, A., Mt. Hutt R.M.D., Rakaia	2	—	5
Mackle Bros., Kaikoura	3	—	1
Marshall, D., Killinchy R.M.D., Leeston	3	0.5	10
Mathieson, G. B., Temuka	3	0.2	2
Merrin, F., sen., Kaiapoi R.M.D.	3	0.3	2
Millar, J. E., Killinchy R.M.D., Leeston	2	—	4
Milliken Bros., St. Andrews (Line A)	1	—	3
Milliken Bros., St. Andrews (Line B)	1	—	2
Morgan, D., Cheviot (Line A)	1	—	4
Morggan, D., Cheviot (Line B)	1	—	2
Morrson, J. L., Morven (Line A)	2	—	15
Morrson, J. L., Morven (Line B)	2	—	5
Munro, A. A., "Kinross," Rotherham	2	0.2	4
N.Z. Loan and Mercantile Agency, Timaru (Line A)	3	—	1
N.Z. Loan and Mercantile Agency, Timaru (Line B)	3	—	4
N.Z. Loan and Mercantile Agency, Timaru (Line C)	3	—	1
Oakley, W., Hororata	2	0.2	22
O'Connell, J. J. Prebbleton (Line A)	3	0.2	1
O'Connor, M. G., Normandy C.D., Timaru P.O.	2	—	2
Oliver, H. A., Hororata	2	—	1
Oliver, J., Hororata	2	—	5
Orbell, W. H., Levels	3	—	2
Orchard, G. B., Cheviot	2	—	1
Palmer, R. R., Orari (Line A)	3	—	1
Parry Bros., Southburn R.M.D.	3	—	3
Parry, R., Southburn R.M.D.	2	—	2
Patterson, B., Waitohi, Pleasant Point	3	—	1
Patterson, N. G., Upper Waitohi, Temuka	3	—	2
Payne, A. E., Springston R.M.D.	2	—	10
Payne, Jas., Springston R.M.D. (Line B)	3	—	4
Payne, John, Yaldhurst-Greendale R.M.D.	2	0.1	25
Petrie, H. H., Swannanoa R.M.D.	2	—	1
Pollard, A. E., 48 Watson's Rd., Harewood	3	—	4
Pooke, F. J., Pareora	2	—	5
Priest, P., Sutherlands	3	—	2
Quinn, M. J., Arowhenua Temuka	3	—	2
Randall, J., Koromiko, Marlborough (Line A)	2	—	3
Randall, J., Koromiko, Marlborough (Line B)	3	—	2
Randall, J., Koromiko, Marlborough (Line C)	2	—	1
Redmond, C., Kimberley R.M.D., Darfield	1	—	12
Redmond, W. G., Courtenay R.M.D., Darfield	2	—	10
Rennie, J., Winchester Settlement, Temuka	3	—	1
Rich, A. J., Kaiapoi R.M.D. (Line B)	3	—	3
Richards, L., Kingsdown R.M.D., Timaru	3	0.5	2
Richmond, W. T., Willowbridge	3	—	4
Roberts Bros., Cave	2	—	1
Royds, R. S., 412 Burnside Rd., Fendalton	3	—	9
Sadler, T. A., Courtenay R.M.D.	2	0.2	7

Name and Address	Group No.	Pecentage of Foreign Varieties	Area in Acres
Salt, A. J., Trentham, Fairlie	2	—	2
Saunders, F. L., Studholme Junction	2	—	8
Scott, Est. of J., Southburn R.M.D.	2	0.2	1
Seyb, L., Washdyke	2	0.3	1
Sheehan, P., St. Andrews (Line A)	2	—	12
Sheehan, P., St. Andrews (Line B)	2	—	3
Shellock, W., Te Pirita R.M.D., Rakaia	2	—	3
Sievwright, K. G., Washdyke (Line A)	2	—	4
Sievwright, K. G., Washdyk (Line B)	2	—	2
Simmons, W., Kingsdown Timaru	2	—	2
Smith, E. J., Prebbleton	2	—	2
Smith, J. & W., Clarkeville Kaiapoi R.M.D. (Line B)	3	—	2
Smith, L. G., Rosewill, R.M.D Timaru	2	—	2
Smith, R. S., St. Andrews	2	—	8
Smith, W. J. M., Seadown R.M.D., Temuka	3	—	1½
South, N. G., Winchester	2	—	2
Speechley, E. N., Maungati R.M.D. (Line A)	2	—	3
Speechley, E. N., Maungati R.M.D. (Line B)	2	—	3
Steele, J., Kimberley (Line A)	1	—	1½
Steele, J., Kimberley (Line B)	1	—	1½
Steven, G. H., Rosewill Tycho (Line A)	3	—	5
Steven, G. H., Rosewill Tycho (Line B)	2	—	1
Steven, G. H., Rosewill Tycho (Line C)	2	—	1
Stewart, A., Marsh's Rd., Templeton (Line B)	2	—	2
Storer, G., Kaiapoi R.M.D (Line A)	3	0.3	5
Swanson, W., Selwyn	3	0.5	3
Thomas, C. B., Springston R.M.D.	3	—	2
Thomson, J. S., Kirwee	2	—	2
Tiffen Bros., Makikihi (Line A)	2	—	1
Turner, G. A., Courtenay R.M.D. (Line A)	2	—	6
Turner, G. A., Courtenay R.M.D. (Line B)	2	—	1½
Tutton, F. A., Springston R.M.D.	2	—	2
Tweedy, S., Dunsandel	2	—	5
Upston, E. E., Selwyn (Line A)	2	—	2
Vaughan, C. A., Kaiapoi R.M.D.	3	—	2
Waite, H. J. N., Timaru-Temuka R.M.D. (Line A)	3	—	1
Waite, H. J. N., Timaru-Temuka R.M.D. (Line B)	2	—	1
Walker, I. C., Halkett R.M.D	2	0.2	2
Walker, W. H., Halkett R.M.D. (Line A)	2	0.2	5
Walker, W. H., Halkett R.M.D. (Line B)	3	0.5	3



Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
Ward, J. A., Southburn R.M.D.	2	—	4
Watson, A. M., Upper Waitohi, Temuka	3	—	1
Westaway, R. J., Christchurch-Greendale R.M.D. (Line A)	1	—	5
Westaway, R. J., Christchurch-Greendale R.M.D. (Line B)	1	—	6
White, W. T., Kaiapoi R.M.D.	3	—	1
Williams, G. I. R., c/o J. H. Williams, Springston R.M.D.	2	0.2	1
Wilson Bros., Halkett R.M.D.	2	—	15
Wilson, C. T., Halkett R.M.D. (Line A)	2	—	3
Wilson, C. T., Halkett R.M.D. (Line B)	2	—	1½
Wilson, M., Halkett R.M.D.	2	—	4
Wilson R. R., Halkett R.M.D.	2	0.2	5
Wilson, V. W., Tycho R.M.D.	2	—	1
Wright, L. T., Annat	2	—	4

Mother Seed (Otago and Southland).

Crowe, E., Wairio	2	—	1
Nimmo, C. J., Ngapara	2	—	2

Commercial Seed (Canterbury, Marlborough, Nelson).

Barnes, W. & Son, 199 Highsted Rd., Christchurch, N.W.4	4	—	3
Bell, H. R., Sandy Knolls (Line B)	4	1.0	8
Blank, E. C., St. Andrews	5	—	3
Bollington, F. A., Kaiapoi R.M.D.	6	—	9
Bradley, W. A., Christchurch Greendale R.M.D.	4	0.3	5
Caird, D. G., Southburn R.M.D.	4	—	4
Caithness, A., Ohape, Temuka (Line A)	4	—	3
Caithness, A., Ohape, Temuka (Line B)	4	0.6	1
Cartwright, A. H., Pleasant Point (Line A)	4	—	1
Crawford, J. M., Belfast Rd., Belfast	4	—	6
Crawford, R. T., Pound Rd., Yaldhurst (Line B)	4	0.2	4
Crawford, T. A., 182 Pound Rd., Yaldhurst (Line A)	4	0.7	3
Curtis Bros., Waituna, Waimate	6	—	2
Curtis, J. J., Pound Rd., Yaldhurst (Line B)	5	—	2
Davidson, J., Oxford Rd., Rangiora	4	—	4
Eivers, F. C., Yaldhurst	6	0.2	4
Franks, L. J., 88 Russley Rd., Upper Riccarton (Line A)	4	—	3
Franks, W. T., 103 Grays Rd., Upper Fendalton	6	—	7
Frazer, T. A., 578 Harewood Rd., Christchurch (Line A)	6	—	4
Frost, W. S., Kaiapoi R.M.D.	4	—	3
Fyall, D., Box 32, Willowbridge	4	1.0	3
Galletly, Mrs. B., St. Andrews	4	0.8	3
Giles, L. W. E., Kaiapoi R.M.D.	6	0.5	5
Gillett, G. N. H., Koromiko, Marlborough (Line A)	4	—	2
Gilmour, W., Lyndhurst	5	1.5	1
Greenslade, S. P., Prebbleton	5	1.8	2
Gregan, J. D., Hunter R.M.D., Waimate	4	0.2	2
Guy, T. A. & E. B., Courtenay R.M.D.	4	—	14
Hanifin Bros., Temuka	4	—	3
Harrison-Wilkie, E. L., Courtenay R.M.D.	4	—	1½
Hussey, R. F., 310 Sawyers' Arms Rd., Harewood	4	0.3	7
Inch, H. V., 104 Ryan's Rd., Upper Riccarton	5	—	2
Jackson Bros., Otipua	5	0.3	4
Jellie, J., Russley Rd., Riccarton (Line B)	5	—	3
Jowers, G. C., Darfield R.M.D.	6	0.1	4
King, E. E., Woodend	4	0.3	3
King, W. H., Rosewill, Timaru (Line B)	5	—	1
Langan, J. W., Kaikoura	4	—	3
McBean, Est. of G., Springston R.M.D.	6	0.3	2
McIlraith, L. H., West Melton	4	—	10
Mercer, B. F., P.O., Hunter	5	1.5	2
Mortland, Mrs. S., Templeton	6	0.2	5
Moyle, E., Southburn R.M.D.	4	0.5	1
Mundy, R., Blake's Rd., Belfast	5	—	5
Musgrove, F. J., Marsh's Rd., Templeton	6	—	10
N.Z. Loan and Mercantile Agency, Timaru (Line D)	6	—	1
Palmer, L. A., Waimea West R.M.D., Brightwater	6	—	1½
Palmer, R. R., Orari (Line B)	6	—	4
Pearce Bros., Seaforth, Washdyke	4	0.3	2
Peterson, B., Seadown R.M.D.	5	0.9	10
Phillips, W., Springston R.M.D.	4	—	1
Philp, F., Seadown R.M.D.	4	—	7
Pooke, T. M., Pareora	4	1.0	2
Proudlock, A., Kaiapoi R.M.D.	4	—	6
Purvis, G., Rangiora	4	—	10
Pye, R., St. Andrews	5	0.2	3
Rapley, G. L., Southbridge	6	—	4
Reynolds, H., Sawyers' Arms Rd., Harewood (Line A)	5	1.8	3
Rose, C. F., Hook R.D., Timaru	4	0.5	5
Ross, A., Upper High St., Waimate	6	1.4	4
Rouse, J. F., Pareora (Line B)	4	—	7
Saunders, A. C., 110 Withells Rd., Upper Riccarton	5	—	2
Shirlow, E., Kaiapoi R.M.D.	4	0.7	4
Smith, J. & W., Clarkeville Kaiapoi R.M.D. (Line A)	4	0.2	12
Spillane, A., Milford, Temuka	4	—	2
Stewart, A., Marsh's Rd., Templeton (Line A)	6	—	28
Storer, G., Kaiapoi (Line B)	4	—	4
Thomas, J. W., Greys Rd., Upper Fendalton	4	—	2
Tiffen Bros., Makikihi (Line B)	5	—	7
Topham, J. W., Temuka (Line B)	4	—	1
Traves, H., Levels	4	0.5	1
Upston, E. E., Selwyn (Line B)	4	1.0	1
Wallace, D. W., South R.D., Timaru	4	—	2
Walsh, G. E., Levels	4	—	2
Ward, R., Timaru Rd., Waimate	4	0.4	1½
Watson, R. G., 245 Gardiner's Rd., Harewood	4	0.8	1
Watts, Mrs. E. F., Rangitata Island	4	0.3	4
Wilson, H. & J., Washdyke (Line A)	4	—	1½

KING EDWARD.

Mother Seed (Canterbury).

Batchelor, R. S., Box 32, Waimate	3	—	1
Bisdee, J. C., Temuka R.M.D. (Line A)	2	—	2
Bisdee, J. C., Temuka R.M.D. (Line B)	3	—	4
Guthrie, A., Orari	3	—	1
Hunter, P., Studholme Jn.	3	—	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	2	—	4

Mother Seed (Otago and Southland)

Alexander, S., Tuatapere	3	—	1
Allison, R., Brydone (Line A)	3	—	3
Allison, R., Brydone (Line B)	3	—	1½
Anderson, A., Box 19, Stirling (Line A)	3	—	1½
Anderson, A., Box 19, Stirling (Line C)	3	—	2
Baker, J. D. & Sons, Tuatapere R.D.	3	—	1

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
Beattie, J., Section 5, Otara-Invercargill R.M.D. ..	2	—	1
Bennett, J. A., Tuatapere R.M.D.	2	0.2	10
Bennett, J. J., Tuatapere R.M.D.	2	—	2
Bennett, R., Tuatapere R.M.D	2	0.1	10
Bond, W., Freshford ..	3	0.2	2
Brown, H. G., Oteramika Rd., Invercargill	1	—	2
Bruce, J. A., Section 2, Otahuti-Invercargill R.M.D. ..	3	0.2	2
Bruce, W. C., Section 8, Glencoe-Invercargill R.M.D. ..	2	0.2	1
Buchanan, G., Riverton R.M.D.	3	—	1
Caldwell, D., Box 17, Edendale	2	0.2	6
Clarke, H. E., Menzies Ferry	2	—	2
Corkery, J., Riverton Tuatapere R.M.D.	2	—	2
Crowe, M., South Hillend-Winton R.M.D.	2	—	1
Dobbie, R., Menzies Ferry ..	2	—	1
Donaldson, C. G., Tuatapere	2	—	2
Duncan, J., Greenvale ..	2	—	2
Eades, R. J., Waikiwi ..	2	—	1
Forde Bros., Riverton-Tuatapere R.M.D.	2	—	2
Griffin, J. G., Riverton-Tuatapere R.M.D.	2	—	1½
Hamilton, G. I., Tuatapere R.M.D.	2	—	4
Hamilton, W., Sec. 5, Wright's Bush-Gladfield R.M.D. ..	3	—	2
Henderson, A., South Hillend-Winton R.M.D.	2	—	2
Imrie, J., Gladstone Rd., Mosgiel (Line A)	3	—	2
Jenkins, G. R., Tuatapere ..	1	—	2
King & Norman, Tuatapere (Line A)	2	—	6
King & Norman, Tuatapere (Line B)	2	—	2
Kirk, R., Tapanui (Line A)	3	—	1
Kirk, R., Tapanui (Line B)	3	—	3
Kirk, R., Tapanui (Line C)	3	—	3
Kirk, R., Tapanui (Line D)	3	—	4
Mosley, I. W., Box 17, Stirling	3	—	4
Myron, A., Ryal Bush ..	2	—	2
Myron, J., Section 7, Glencoe-Invercargill R.M.D. ..	2	—	1
Norman, A., Tuatapere ..	2	—	3
Norman, J. H., Tuatapere R.M.D.	2	—	4
Norman, W., Tuatapere R.M.D. (Line A)	1	—	2
Norman, W., Tuatapere R.M.D (Line B)	1	—	5
Rumler, H. V., Seaward Downs	2	—	1
Sheddan, G. B., Sec. 2, Otahuti-Invercargill R.M.D. ..	2	—	1
Skinner, J. L., North Taieri	3	—	3
Stewart, J. M., Washpool ..	2	—	1
Stiven, J. E., Pavetai R.M.D	3	—	2
Stodart, G. D., Orawia ..	2	—	4
Thompson, W. J., Otahuti-Invercargill R.M.D. ..	2	—	1
Throp, O. R., Te Houka .	3	—	1
Waite, A., Tapanui .. .	3	—	1
Wells, A. J., Sec. 5, Otahuti Invercargill R.M.D.	3	—	1
Wilkie, R., Box 897, Dunedin	3	—	2
Wilson, C. H., West Plains-Invercargill R.M.D. ..	3	—	2
Young, J., Allenton	3	—	2
Young, S., Outram R.M.D. .	3	—	1

Commercial Seed (Canterbury).

Bisdee, J. C., Temuka R.M.D. (Line C)	4	—	3
Botting, A. R., Factory Rd., Temuka	4	—	2
Horsnell, H. S., Morven ..	4	—	2
Kelly, D., Willowbridge (Line A)	4	—	1
Kelly, D., Willowbridge (Line B)	4	—	3
Newall & Jones, Queen St. Waimate	4	—	2
Ottley, J. S., Garlands Rd., Waimate	4	0.2	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	4	—	3

Commercial Seed (Otago and Southland).

Anderson, A., Box 19, Stirling (Line B)	4	—	4
Birtles, J. L., jun., College Rd., Oamaru	4	—	2
Free, A. T., Outram ..	5	—	1
Hughes, E. F., Miller's Flat ..	4	—	1
Imrie, J., Gladstone Rd., Mosgiel (Line B)	5	—	2
Stodart, A. W., Gladstone Rd., Mosgiel	4	—	3
Thomas, D. J., Gorge Rd. ..	4	0.3	2
Willocks, S., Stirling ..	4	—	2

DAKOTA.

Mother Seed (Canterbury).

Adams, D. A., Southbridge ..	4	—	2
Chambers, A. J., Oxford Rd., Rangiora	4	—	4
Chambers, W. J., Christchurch-Greendale R.M.D.	4	—	2
Chambers Bros., Methven (Line B)	4	0.1	13
Greenwood, A. A., Southbridge (Line A)	4	—	2
Greenwood, A. A., Southbridge (Line B)	4	—	3
Greenwood, F. H., Southbridge (Line A)	4	—	1
Hight, C., "Carberry," Christchurch-Greendale R.D. ..	4	—	5
Hulston, A. J., West Melton-Greendale R.M.D. ..	3	—	5
McCormick, D., Southbridge	4	—	1
McVinnie, D., Christchurch-Greendale R.M.D. ..	3	—	1
Muirhead, J. H., Lagmhor ..	4	—	10
Rapley, G. L., Southbridge (Line B)	3	—	1
Robinson, R. G. Ltd., Box 4, Papanui	3	—	1
Watson, B. D., Box 16, Dunsandel	4	—	1
Watts, Mrs. E. F., Rangitata Island (Line B)	3	—	5
Wilson Bros., Halkett R.M.D.	4	—	4
Wolff, R. G., Horrelville R.M.D. (Line C)	4	—	2
Wright, Est. of Q. A., Annat	3	—	3

Commercial Seed (Canterbury and Marlborough).

Barnett, R., Dunsandel ..	5	—	15
Brick, P., Mt. Hutt R.M.D., Rakaia (Line A)	6	0.1	4
Brick, P., Mt. Hutt R.M.D., Rakaia (Line B)	5	0.1	2
Cain, W. E. S., Mt. Hutt R.M.D., Rakaia (Line A)	5	—	2
Calder, G., Halkett R.M.D. ..	5	—	3
Campion, C. A., Mt. Hutt R.M.D., Rakaia	6	—	2
Carr, J., Mt. Hutt R.M.D., Rakaia	5	—	1
Chambers Bros., Methven (Line A)	8	—	5
Chapman, W. H., Lauriston	7	0.3	2
Chappell, J. A., Killinchy R.M.D., Leeston	5	—	3
Chappell, S. E., Killinchy R.M.D., Leeston	8	—	5
Cook, H. E., Methven (Line A)	6	—	2
Cook, H. E., Methven (Line B)	6	—	4
Cook, H. E., Methven (Line C)	6	—	1
Crozier, W. J., Mt. Hutt R.M.D., Rakaia (Line A)	5	—	1
Crozier, W. J., Mt. Hutt R.M.D., Rakaia (Line B)	6	—	4
Elliott, D., Albury	7	—	1
Gane, W. H., Spring Creek, Marlborough	6	—	1½
Greenwood, F. H., Southbridge (Line B)	5	—	2

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
Greenwood, H. J., Southbridge	7	—	13
Hoatten, I., Elgin	8	—	4
Holmes, A., Mt. Hutt R.M.D., Rakaia (Line A)	6	—	4
Holmes, A., Mt. Hutt R.M.D., Rakaia (Line B)	6	—	1
Hussey, C. A., 310 Sawyers' Arms Rd., Harewood	7	—	2
Johnson, H. W., Box 12, Dunsandel	5	—	8
Jowers, G. C., Darfield R.M.D.	5	—	3
Kaill, E., Southbridge (Line A)	5	—	1
Kaill, E., Southbridge (Line B)	5	—	7
Keddie, R., Mitcham, via Rakaia	5	—	3
Lindsay, P. G. W., Waikakahi, Waimate	7	—	1
McKenzie & McCormick, Lauriston (Line A)	6	0.1	8
McPhail, W. A., Mitcham, via Rakaia (Line A)	7	—	8
McPhail, W. A., Mitcham, via Rakaia (Line B)	7	—	3
Millar, R. J., Killinchy R.M.D., Leeston	6	—	7
N.Z. Loan and Merc. Agency, Christchurch (Line A)	5	—	5
N.Z. Loan and Merc. Agency, Christchurch (Line B)	5	—	5
N.Z. Loan and Merc. Agency Christchurch (Line D)	7	—	2
N.Z. Loan and Merc. Agency, Christchurch (Line E)	7	0.8	8
Oakley, W., Hororata	7	—	3
Oliver, H. A., Hororata	5	—	4
Pluck, J., Mitcham, via Rakaia	5	—	4
Pyne, Gould, Guinness Ltd., Christchurch (Line A)	6	—	9
Pyne, Gould, Guinness Ltd. Christchurch (Line B)	6	—	6
Rapley, G. L., Southbridge (Line A)	7	—	3
Ruddenklau, F. H., Rangitata Island (Line A)	5	—	12
Ryan, P. F., Springs-Weedons R.M.D.	8	—	8
Steele, J., Kimberley	5	—	3
Stockdill, D. E., Mt. Hutt R.M.D., Rakaia	6	—	1
Tweedy, S., Dunsandel	8	—	5
Watson, P. A., Winchmore R.M.D.	7	—	1
Watts, Mrs. E. F., Rangitata Island (Line C)	5	—	3
Watts, Mrs. E. F., Rangitata Island (Line D)	5	—	6
Wilson, M., Halkett R.M.D.	5	—	4
Wolff, R. G., Horrelville R.M.D (Line A)	5	—	1
Wolff, R. G., Horrelville R.M.D (Line B)	6	—	9

ARRAN CHIEF.

Mother Seed (Canterbury).

Boyce, W. J., Waituna, Waimate	3	—	6
Cox, S., Box 9, Willowbridge (Line A)	3	—	4
Faulkner, J. C., Willowbridge (Line B)	2	—	6
Faulkner, J. C., Willowbridge (Line C)	3	—	1½
Faulkner, J. C., Willowbridge (Line D)	3	—	1½
Fletcher, W. J., Willowbridge (Line B)	3	—	10
Forsythe, J., Willowbridge (Line A)	3	—	4
Forsythe, J., Willowbridge (Line B)	2	—	4
Hayman, A. B., Studholme Junction (Line A)	3	—	4
Henshaw, F. J., Studholme Junction (Line B)	2	—	5
Lindsay, J., Studholme Junction (Line A)	3	—	13
Lindsay, J., Studholme Junction (Line B)	2	0.4	2
Rollinson, F. A. & Sons, Studholme Junction (Line C)	3	—	6
Wilson, E. R., Junction Rd., Waimate	3	—	2
Wright, L. T., Annat	3	0.2	2

Mother Seed (Otago and Southland).

Anderson, A., Box 19, Stirling (Line B)	3	—	1½
Bannatyne, A., Waikouaiti	3	—	2
Clarke, H. E., Menzies Ferry	3	—	1½
Corkery, J., Riverton-Tuatapere R.M.D.	2	—	1
Crowe, E., Wairio	3	—	1
Daly Bros., Riverton-Tuatapere R.M.D. (Line A)	2	—	1
Evans, A. G., Riverton-Tuatapere R.M.D.	2	—	1
Grant, J., Section 2, Wright's Bush-Gladfield R.M.D.	2	—	1
Griffin, J. G., Riverton-Tuatapere R.M.D.	2	—	1½
Horrell, G., Riverton-Tuatapere R.M.D.	2	—	3
Jenkins, G. R., Tuatapere	3	—	1
King & Norman, Tuatapere	2	—	1
Kirk, R., Tapanui (Line A)	2	—	1
Kirk, R., Tapanui (Line B)	3	—	4
Knowler, C. E., Riverton-Tuatapere R.M.D.	2	—	3
Knowler, H., Riverton-Tuatapere R.M.D.	1	—	5
Knowler, H. C., jun., Riverton-Tuatapere R.M.D. (Line A)	3	—	3
Knowler, H. C., jun., Riverton-Tuatapere R.M.D. (Line B)	2	—	2
Mosley, I. W., Box 17, Stirling	3	—	8
Muldrew, R., Tuatapere	2	—	1
Norman, A., Tuatapere	2	—	1
O'Brien, T., Riverton-Tuatapere R.M.D. (Line A)	2	—	1
O'Brien, T., Riverton-Tuatapere R.M.D. (Line B)	2	—	1
Sim, A. R., Piko Piko, Tuatapere	2	—	1
Skinner, J. L., North Taieri	3	—	3
Weir, J. G., Box 35, Stirling (Line A)	3	—	4
Weir, J. G., Box 35, Stirling (Line C)	3	—	1½

Commercial Seed (Canterbury).

Barnes, W. & Son, 199 Highsted Rd., Ch'ch., N.W.4	6	—	1½
Breakwell, A. J., Tinwald	5	—	1
Burness, A. J., South R.M.D., Timaru	5	—	7
Campbell, P., Studholme Jn.	4	—	3
Cox, S., Box 9, Willowbridge (Line B)	4	—	2
Faulkner, J. C., Willowbridge (Line A)	4	—	6
Fletcher, W. J., Willowbridge (Line A)	5	0.4	12
Hayman, A. B., Studholme Junction (Line B)	4	—	5
Hayman, A. B., Studholme Junction (Line C)	4	—	7
Henshaw, F. J., Studholme Junction (Line A)	4	0.2	9
Keen, L., Morven	4	—	7
Kelly, D., Willowbridge (Line A)	5	1.0	10
Lange, C. & C. D., Willowbridge	4	0.4	8
Meynell, T. W., Timaru Rd., Waimate	6	—	7
N.Z. Loan & Merc. Agency, Timaru	4	0.2	1
Ryan's Est., Springston R.M.D.	5	—	10
Saunders, E. E., Studholme Junction (Line A)	6	—	2
Saunders, E. E., Studholme Junction (Line B)	6	0.4	2
Saunders, F. L., Studholme Junction (Line A)	5	—	4
Saunders, F. L., Studholme Junction (Line B)	6	—	4

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
Simpson, W. M., "Ryland," Waituna, Waimate	5	—	3
Sullivan, G., Studholme Jn.	4	—	8
Tiffen Bros., Makikihi	5	—	2
Commercial Seed (Otago and Southland).			
Allison, R., Brydone	5	—	1½
Anderson, A., Box 19, Stirling (Line A)	4	—	3
Birtles, J. L., jun., College Rd., Oamaru	6	—	1
Daly Bros., Riverton-Tuatapere (Line B)	4	—	1
Weir, J. G., Box 35, Stirling (Line B)	4	—	3
Weir, J. G., Box 35, Stirling (Line D)	4	0.2	11
INVERNESS FAVOURITE.			
Mother Seed (Canterbury).			
Atkinson, R. J., 565 Madras St., Christchurch	3	—	5
Blank, W., Yaldhurst	3	—	6
Boyce, A., Doyleston	3	0.3	2
Brears, W. C., Southbridge R.M.D.	3	0.3	3
Bull, F. A., Waddington	3	—	6
Dugan, J. R., Southbridge R.M.D.	3	—	5
Fyall, D., Box 32, Willowbridge	2	—	8
Greenwood, F. H., Southbridge	3	—	5
Greenwood, H. J., Southbridge	3	—	7
Hussey, R. F., 310 Sawyers' Arms Rd., Harewood	3	—	5
Jenkins, T. L., Sheffield	3	—	2
Kelly, D., Willowbridge (Line A)	2	—	7
Kelly, D., Willowbridge (Line B)	3	—	83
Kennard, J. R., Waituna, Waimate	3	—	1
Lewis, C. E., Sefton R.M.D.	2	—	6
Lindsay, J., Studholme Jn.	2	—	2
McClelland, W. J., Southbridge R.M.D.	3	—	1
Macdonald, R., Annat (Line A)	2	—	8
Macdonald, R., Annat (Line B)	2	—	4
McLenaghen Bros., Killinchy R.M.D., Leeston	3	—	4
Martin, A., Morven (Line B)	2	—	5
Meynell, T. W., Timaru Rd., Waimate	2	—	7
Millar, J. E., Killinchy R.M.D Leeston	3	—	4
Payne, A. E., Lincoln	3	—	5
Piner, E., Annat (Line A)	2	—	5
Piner, E., Annat (Line B)	2	—	3
Richards, W., South R.D., Timaru	3	—	2
Rose, C. F., Hook R.D., Timaru (Line A)	3	—	3
Rose, C. F., Hook R.D., Timaru (Line B)	3	—	3
Ryan, P. F., Springs-Weedons R.D.	3	—	16
Ryan's Est., Springston R.M.D.	2	—	8
Schaffer, F. L., Springston R.M.D.	3	—	6
Tiffen Bros., Makikihi (Line B)	3	—	9
Treleaven Bros., 148 Lower Styx Rd., Marshland	3	—	15
Mother Seed (Otago and Southland).			
Free, A. T., Outram R.M.D.	3	—	3
Kirk, R., Tapanui	3	—	1
Knowler, H., sen., Riverton-Tuatapere R.M.D.	2	—	1
Young, J., Allenton	3	—	2
Commercial Seed (Canterbury and Marlborough).			
Alexandre, H., Belfast	5	—	2
Amor, A. W., Woodend (Line B)	6	—	3
Amor, A. W., Woodend (Line C)	6	—	5
Bell, D. F., Sandy Knolls	5	—	2
Bell, H. R., Sandy Knolls	5	—	2
Broughnan, J. F., Middle Rd., Blenheim	4	—	1½
Busby, C. V., Kaiapoi	4	—	2
Caithness, A., Ohape, Temuka	4	—	1
Corbett, E., Glenavy	5	—	10
Crawford, J. M., Belfast Rd., Belfast	4	—	4
Farquhar, S. G., Radcliff Rd., Styx	4	—	4
Fletcher, W. J., Willowbridge	6	—	6
Hassall, G. H., Kaiapoi R.M.D.	5	—	5
Hewson, R. H., Seadown	4	0.2	2
Holmes, W. J., Rolleston	5	—	5
Kimber, T. A., Southbridge R.M.D.	5	—	3
Kingsbury, G. E. R., South R.D., Timaru	5	—	2
Lange, C. & C. D., Willowbridge (Line A)	4	—	1
Lange C. & C. D., Willowbridge (Line B)	5	—	2
Meadows, D. L., Springston R.M.D.	5	—	4
Mehrtens, J. L., Camside R.M.D., Rangiora (Line A)	6	—	6
Mehrtens, J. L., Camside R.M.D., Rangiora (Line B)	6	—	2
Palmer, R. R., Orari	4	—	2
Paul, A., Waikakahi, Waimate	4	—	4
Purvis, R. M., Oxford Rd., Rangiora	4	0.4	6
Robson, F. H., Lincoln	6	—	3
Royds, R. S., 412 Burnside Rd., Fendalton	4	—	3
Ruddenklau, J. G., Waikakahi R.M.D., Waimate	6	—	16
Washbourne, E. A., Dunsandel	5	—	18
AUCKLANDER TALL TOP.			
Mother Seed (Canterbury and Marlborough).			
Annand, A. B. & Co., Timaru	2	—	1½
Bailey, J., Kaiapoi R.M.D.	3	—	7
Cooper, L. G., Balcairn	2	—	5
Fleming, I. M., Balcairn	2	—	1½
Frost, C. H., Balcairn	3	0.2	4
Gane, W. H., Spring Creek, Marlborough	3	—	1½
Minchington, F. W., Fernside R.M.D.	2	—	5
Oliver Bros., Hororata	2	—	3
Oliver, J., Hororata	2	0.2	7
Robinson, R. G. Ltd., Box 4, Papanui (Line A)	1	—	3
Roper, R. S., Halkett	2	—	2
Seyb, L., Washdyke (Line B)	2	—	3
Steele & Dawson, c/o F. Steele, Fernside	2	—	10
Tweedy, S., Dunsandel	2	—	3
Commercial Seed (Canterbury).			
Breakwell, A. J., Tinwald	4	1.2	2
Bury, H., Fernside-Rangiora R.M.D.	5	—	4
Chatterton, W. V., Dunsandel	4	—	1
Guy, T. A. & E. B., Courtenay R.M.D.	5	—	5
Hide, E. D., Rangiora R.M.D.	5	—	2
Seyb., L., Washdyke (Line A)	4	—	1
Storer, G., Kaiapoi R.M.D.	5	0.2	3
ARRAN BANNER.			
Mother Seed (Canterbury).			
Curtis Bros., Waimate	3	—	2
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	3	—	3
Leathwick, A., Hook R.M.D., Waimate	2	—	1
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	2	—	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line C)	2	—	1½
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line D)	3	—	1

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
Robinson, R. G. Ltd., Box 4, Papanui (Line B) ..	3	—	2
Robinson, R. G. Ltd., Box 4, Papanui (Line D) ..	3	—	4
Wright, L. T., Annat ..	3	0.2	2
Mother Seed (Southland).			
O'Brien, T., Riverton-Tuatapere R.M.D.	2	—	1
Commercial Seed (Canterbury).			
Barnes, W. & Son, 199 Highsted Rd., Ch'ch., N.W.4 ..	4	—	1½
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	4	0.2	5
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line C)	4	0.2	2
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line D)	5	1.8	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	5	1.5	2
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	5	—	5
Robinson, R. G. Ltd., Box 4, Papanui (Line C) ..	4	—	5
Commercial Seed (Southland).			
Knowler, H., sen., Riverton-Tuatapere R.M.D. ..	4	—	1
EPICURE.			
Mother Seed (Canterbury).			
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	2	—	15
Jellie, J., Russley Rd., Riccarton	3	—	1
N.Z. Loan and Merc. Agency, Christchurch	3	—	4
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	3	—	2
Robinson, R. G. Ltd., Box 4, Papanui (Line B) ..	3	0.1	3
Shellock, W., Te Pirita R.M.D., Rakaia	3	—	5
Wright, L. T., Annat ..	3	—	4
Commercial Seed (Canterbury).			
Annand, A. B. & Co., Timaru	5	—	1½
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line C)	4	0.2	6
Macdonald, R., Annat (Line A)	4	—	6
Macdonald, R., Annat (Line B)	4	—	3
Page, S. T., Sheffield ..	4	—	1
Robinson, R. G. Ltd., Box 4, Papanui (Line E) ..	4	—	3
Shellock Bros., Te Pirita R.M.D., Rakaia	4	0.5	5
CLIFF'S KIDNEY.			
Commercial Seed (Canterbury).			
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	5	—	7
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	6	—	4
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	6	—	1
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	6	1.0	5
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line C)	6	0.3	5
Robinson, R. G. Ltd., Box 4, Papanui	5	0.3	4

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
JERSEY BENNES.			
Mother Seed (Canterbury).			
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	5	—	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	5	—	3
Mother Seed (Southland).			
Burgess, D., West Plains-Invercargill R.M.D. ..	4	—	3
Fyfe, Mrs. E. G., Sec. 3, Otara Invercargill R.M.D. ..	5	—	3
MAJESTIC.			
Mother Seed (Canterbury).			
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	2	—	5
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	2	—	10
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	3	—	5
Commercial Seed (Canterbury).			
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line E)	5	—	5
ROBIN ADAIR.			
Mother Seed (Canterbury).			
Hobday, J. H., c/o R. G. Robinson Ltd., Box 4, Papanui	4	0.2	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	3	—	4
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	3	—	1
Robinson, R. G. Ltd., Box 4, Papanui (Line C) ..	3	—	3
EARLY ROSE.			
Commercial Seed (Canterbury).			
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line A)	5	0.2	4
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line B)	4	1.8	3
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui (Line C)	5	—	3
MAORI CHIEF.			
Commercial Seed (Canterbury).			
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	5	—	4
Robinson, R. G. Ltd., Box 4, Papanui (Line B) ..	5	0.5	5
Robinson, R. G. Ltd., Box 4, Papanui (Line C) ..	6	—	5
UP-TO-DATE.			
Mother Seed (Canterbury).			
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	3	—	2
Robinson, R. G. Ltd., Box 4, Papanui (Line B) ..	3	—	2
Robinson, R. G. Ltd., Box 4, Papanui (Line C) ..	4	—	1

Certificate-of-Record Testing

Closing List for 1939

Contributed by the DAIRY DIVISION.

The following list completes the publication of production figures for cows qualifying under the Certificate-of-Record system during the calendar year 1939.

YEARLY DIVISION—FIRST CLASS.

Jerseys.

Name of Cow.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season:		
				Days.	Milk.	Fat.
Junior Two-year-old		Yrs. Dys.	lb.		lb.	lb.
Kiteroa Gamboge Gleam	S. Irwin Crookes, Kiteroa Ltd., Auckland	2 59	281.4	365	10,664.2	596.17
Lowlands Summer Breeze	W. S. McEwen, Hamilton	2 9	276.4	365	8,807.1	559.73
Roseneath Honey	W. J. Russell, Leithfield	2 31	278.6	365	6,868.6	461.62
Wellfield Violetta	S. G. Ker, Whakatane	2 19	277.4	365	6,890.9	443.08
Jersey Glen Tulip	F. V. Bryant, Mangatainoka	2 21	277.6	365	7,162.8	443.06
Greencroft Buttercup	J. Bones, Ohaupo	2 2	275.7	365	7,866.6	440.18
Major's Diana	E. Wright, Redvale, North Auckland	2 34	278.9	365	7,480.3	434.48
Jersey Glen Silver Chimes	F. V. Bryant, Mangatainoka	2 8	276.3	365	8,478.8	427.92
Premier Royal Angel	W. Dunn & Sons, Waihou	1 324	275.5	365	7,340.0	425.53
Mangapiko Nina	E. R. Johnson, Te Awamutu	1 331	275.5	348	7,034.8	422.32
Jersey Glen Lady Beauty	F. V. Bryant, Mangatainoka	2 14	276.9	365	7,373.5	407.34
Premier Royal Trousseau	W. Dunn & Sons, Waihou	1 339	275.5	365	6,976.6	403.03
Jersey Glen Silver Ray	F. V. Bryant, Mangatainoka	2 28	278.3	365	7,710.3	401.06
Woodlands May's Queen	Misses W. & C. Wright, Redvale, North Auckland	1 364	275.5	365	6,955.2	393.63
Wellfield Doris	S. G. Ker, Whakatane	2 19	277.4	362	7,112.5	371.19
Earlston Lorraine	Chisholm Bros., Hunterville	1 335	275.5	311	6,097.8	366.29
Standard Sweet Thelma	Yelchich Bros., Waiuku	2 16	277.1	365	5,769.2	364.91
Lily's Neat Maid	A. E. Sly, Whakaronga	1 289	275.5	327	6,053.4	343.83
Pa View Pearl	W. H. Gordon, Greytown	2 46	280.1	365	5,737.1	337.62
Waikari Fairy	L. A. Higgins, Nelson	1 357	275.5	365	5,472.7	325.06
Tuhirangi Lyric	R. J. U. Wellington, Masterton	1 354	275.5	365	5,444.4	321.38
Waikari Lizzie	L. A. Higgins, Nelson	1 361	275.5	365	5,322.8	310.54
Senior Two-year-old						
Coniston Gay Buttercup	R. Waterhouse, Takanini	2 330	308.5	365	9,094.1	681.69
Kiteroa Gamboge Lucia	S. I. Crookes, Kiteroa Ltd., Auckland	2 298	305.3	365	11,318.0	619.49
Cringleber Coy Victress	R. Waterhouse, Takanini	2 176	293.1	365	8,425.9	595.79
Greencroft Gold Lace	J. Bones, Ohaupo	2 293	304.8	365	9,804.6	550.36
Greencroft Maud	J. Bones, Ohaupo	2 316	307.1	365	7,995.2	477.89
Coniston Nona	R. Waterhouse, Takanini	2 258	301.3	365	6,853.8	474.30
Greencroft Miss Ace	J. Bones, Ohaupo	2 272	302.7	365	8,943.1	474.11
Velebit Quietly	G. E. Yelchich, Waiuku	2 326	308.1	365	7,995.6	446.65
Earlston Ladylike	Chisholm Bros., Hunterville	2 335	309.0	330	8,549.1	445.17
Wellfield Birdie	S. G. Ker, Whakatane	2 172	288.2	365	6,824.3	424.55
Waikari Eminent	L. A. Higgins, Nelson	2 364	311.9	330	7,462.8	407.85
Three-year-old						
Craigknoll Wait and See	W. S. McEwen, Hamilton	3 257	337.7	365	9,576.8	633.54
Coniston Gay Duchess	R. Waterhouse, Takanini	3 84	320.4	365	8,336.1	602.32
Greencroft Perfect Lady	J. Bones, Ohaupo	3 303	342.3	363	9,130.3	601.53
Glenmore Devotion	W. S. McEwen, Hamilton	3 362	348.2	365	10,147.2	587.04
Waipiko Anthem	C. G. C. Dermer, Cheltenham	3 360	348.0	365	9,571.6	564.03
Waipiko Joy Song	C. G. C. Dermer, Cheltenham	3 7	312.7	365	9,762.9	551.71
Tolgarth Colleen	H. H. Sutton & Sons, Waihi	3 65	318.5	365	10,457.5	551.35
Craigavon Bertha	H. S. Fleming, Papakura	3 55	317.5	365	9,415.4	547.10
Glenrose Treasure Pet	Misses W. & C. Wright, Redvale	3 356	347.6	365	9,110.5	505.84
Greencroft Little Miss	J. Bones, Ohaupo	3 22	314.2	289	9,319.4	505.07
Kupata Gipsy Maid	Tizard Bros., Konu, Thames	3 60	318.0	332	9,015.5	490.22
Velebit Lenora	G. E. Yelchich, Waiuku	3 311	343.1	365	8,296.4	489.40
Waipiko Idea	C. G. C. Dermer, Cheltenham	3 308	342.8	365	8,426.5	483.64
Montrose Buttercup	Yelchich Bros., Waiuku	3 43	316.3	365	7,937.8	475.54
Greencroft Margaret	J. Bones, Ohaupo	3 52	317.2	365	7,172.9	466.53
Kiteroa Gamboge Faithful	S. I. Crookes, Kiteroa Ltd., Auckland	3 52	317.2	365	8,340.3	465.51
Otiritiri Susanne	Mrs. F. W. Guinness, Ealing, Cant'by	3 173	329.3	365	8,292.7	423.66
Velebit Maud	G. E. Yelchich, Waiuku	3 301	342.1	365	7,889.9	403.42
Waikari Doie	L. A. Higgins, Nelson	3 356	347.6	311	7,463.2	370.51
Golden Fern Golden Lady	D. O'Sullivan, Inglewood	3 361	348.1	288	6,521.9	369.05
Four-year-old						
Greencroft Hilda	J. Bones, Ohaupo	4 94	357.9	365	12,965.1	751.16
Oxford Dale Eleanor	R. Waterhouse, Takanini	4 7	349.2	365	11,058.1	732.91
Kingsmere Heroine	A. J. Arthur, Tuhikaramea	4 335	382.0	365	11,840.7	684.47
Bridge View Daylight	W. S. McEwen, Hamilton	4 343	382.8	365	11,764.3	628.04
Clara's Golden Star	Truby King, New Plymouth	4 3	348.8	365	11,092.2	625.42
Holly Oak Darkie	A. R. Bayly, Omata, Taranaki	4 334	381.9	365	10,793.1	609.44
Green Meadows Feoni	T. W. Wardlow, Waimana, Bay of Plenty	4 297	378.2	365	9,859.6	571.62
Jersey Glen Faith	F. V. Bryant, Mangatainoka	4 337	382.2	365	10,893.7	557.27
Almadale Elect	Dr. G. Walker, Maunu, Whangarei	4 364	484.9	365	8,642.6	488.91
Ennismore Lady Diana	W. Rayworth, Halcombe	4 293	377.8	297	7,704.7	421.80

Jerseys—continued.

Name of Cow.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season: Days.	Milk.	Fat.
Mature		Yrs. Dys.	lb.		lb.	lb.
Kiteroa Gamboge Goldie	S. I. Crookes, Kiteroa Ltd., Auckland	5 117	385.0	365	16,028.1	856.46
Jersey Glen Constance	F. V. Bryant, Mangatainoka	6 74	385.0	365	11,542.6	671.42
Meon Noku	Truby King, New Plymouth	5 2	385.0	365	10,143.9	639.02
Tauwhare Violet	E. R. Johnson, Te Awamutu	8 315	385.0	365	10,475.6	588.99
Mount View Flora	G. & E. Worthington, Maungaturoto	7 22	385.0	365	9,966.6	580.07
Merton Gladys	A. C. Smith, Hamilton	6 48	385.0	305	9,280.3	549.61
Reshure Supremacy	H. S. Fleming, Papakura	7 315	385.0	334	8,726.7	502.55
Meon Kosmos	G. & E. Worthington, Maungaturoto	7 364	385.0	365	9,038.9	502.18
Midland Fawny Choice	G. & E. Worthington, Maungaturoto	8 11	385.0	365	8,409.9	489.75
Crestdale Lonely	L. C. Jennins, Lepperton	5 13	385.0	365	7,990.1	468.95
Montrose Choice	Yelchich Bros., Waiuku	6 113	385.0	335	8,119.8	463.90
Ridgeway Nymph	W. T. Luxton, Hamilton	7 343	385.0	365	8,180.3	403.97
Jersey Farm Pauline	H. R. Benbow, Ormondville	7 313	385.0	327	7,873.3	389.98
Ujiji Bossy	R. D. Thomson, Tokoroa	7 2	385.0	365	7,515.8	386.12

Friesians.

Junior Two-year-old						
Weston Sylvia Beets Posch	R. Dick, Weston, Oamaru	2 1	275.6	365	14,622.9	619.38
Ahikouka Colantha Onyx	A. Wallace, Ngakuru, Rotorua	2 9	276.4	365	13,659.6	530.52
Koromiko Starlight	M. J. Parker, Dalefield	1 364	275.5	365	13,562.6	522.75
Rosevale Regina Posch	H. North & Sons, Omimi, Dunedin	2 29	278.4	365	11,337.9	472.78
Koromiko Lady Jewel	M. J. Parker, Dalefield	1 350	275.5	347	12,776.3	462.85
Lucernvale Maisy	J. Stalker & Son, Greenpark, Cant'by.	2 8	276.3	365	12,566.0	449.27
Lucernvale Darkie	J. Stalker & Son, Greenpark, Cant'by.	2 100	285.5	321	9,397.4	412.74
Weston Daphne Dellhurst	R. Dick, Weston, Oamaru	1 350	275.5	289	10,921.7	432.70
Junior Three-year-old						
Rosevale Echo Triumph	K. Macphail Wainui, Banks Peninsula	3 51	317.1	365	15,660.7	481.41
Senior Three-year-old						
Rosevale Beets Posch	H. North & Sons, Omimi, Dunedin	3 312	343.2	351	14,570.6	541.90
Mature						
Rosevale Lorna Posch Catrina	H. North & Sons, Omimi, Dunedin	6 30	385.0	362	18,954.7	620.98
Fairburn Pauline Grebegga	R. H. D. Hudson, Burwood, Ch'ch.	7 335	385.0	281	12,902.3	521.47
Mahoe Louise	Major R. A. Wilson, Bulls	7 124	385.0	362	13,386.6	524.50

* Wrongly listed in March, 1940, issue under Second Class.

Milking Shorthorns.

Junior Two-year-old						
Greenvale Buttercup Fancy	G. G. Goodwin, Waikuku	1 344	275.5	365	10,645.7	411.19
Senior Three-year-old						
Pinedale Rona 4th	G. D. Hall, Otorohanga	3 310	343.0	333	10,196.0	380.37
Junior Four-year-old						
Pinedale Beauty 7th	G. D. Hall, Otorohanga	4 37	352.2	341	11,762.8	503.22
Senior Four-year-old						
Pinedale Stylish Lilac	G. D. Hall & Son, Otorohanga	4 336	382.1	365	12,663.8	617.59
Mature						
Terrace View Minnie	G. D. Hall & Son, Otorohanga	7 355	385.0	325	11,722.6	502.98
Pinedale Freda	G. D. Hall & Son, Otorohanga	7 226	385.0	333	9,019.5	388.58

Ayrshires.

Mature						
Balmoral Jewel	W. Moore & Son, Masterton	5 111	385.0	316	8,812.4	408.09

YEARLY DIVISION—SECOND CLASS.

Jerseys.

Junior Two-year-old						
Everest Beauty's Lady	H. G. Old, Waitara	2 19	277.4	365	10,613.3	528.32
Greencroft Patricia	J. Bones, Ohaupo	1 339	275.5	365	6,906.6	409.11
Jersey Glen Treasure	F. V. Bryant, Mangatainoka	2 39	279.4	365	6,461.5	384.51
Senior Two-year-old						
Coniston Mermaid's Lass	R. Waterhouse, Takanini	2 362	311.7	365	8,993.3	664.50
Greencroft Frivolous	J. Bones, Ohaupo	2 271	302.6	365	8,838.3	572.12
Greencroft Gracie	J. Bones, Ohaupo	2 148	290.3	365	8,703.7	567.07
Wellfield Sybil	S. G. Ker, Whakatane	2 117	287.2	365	7,555.3	480.84
Ypres Adeline	J. G. Horn, Ohau	2 256	302.0	365	8,585.4	460.79
Three-year-old						
Premier Seraphim	W. Dunn & Sons, Waihou	3 37	315.7	365	11,500.1	602.90
Greencroft Primrose	J. Bones, Ohaupo	3 23	314.3	365	9,436.4	514.41
Highfield Margaret	A. R. Bayly, Omata, Taranaki	3 182	330.2	365	9,231.6	480.75
Four-year-old						
Meon Narcissus	E. R. Johnson, Te Awamutu	4 322	380.7	365	9,373.6	545.65
Beaulieu Comely Maid	Dr. G. Walker, Maunu, Whangarei	4 233	371.8	365	7,771.1	442.06
Royton King's Emeralda	H. Moreland, Hamilton	4 59	354.4	365	7,037.6	407.82
Mature						
Tranby Mignonette	A. C. Smith, Melville	10 23	385.0	365	13,397.8	738.65
Coniston Viola's Coy Girl	R. Waterhouse, Takanini	5 250	385.0	365	10,461.2	701.18
Tokorangi Aletta	J. Pullar & Sons, Winton, Southland	7 347	385.0	365	10,162.1	621.68
Everest Limelight's Pet	H. G. Old, Waitara	5 280	385.0	365	9,942.2	592.74
Wellfield Choice	A. J. Arthur, Tuhikaramea	5 311	385.0	365	10,418.8	570.60
Beaulieu Diana	Dr. G. Walker, Maunu, Whangarei	5 56	385.0	365	7,589.0	464.80
Vernon Premium Lass	Wesley College Paerata	6 318	385.0	365	10,370.0	509.63

* Wrongly listed in March, 1940, issue under Friesian.

Friesian.

Name of Cow.	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season:		
				Days.	Milk.	Fat.
		Yrs. Dys.	lb.		lb.	lb.
Mature						
Fairburn Daisy Princess	Allan Bros., Allandale, Christchurch	6 15	385.0	365	20,311.2	710.34

Milking Shorthorns.

Senior Three-year-old						
Allandale Rosie	R. S. Allan & Son, Hatuma	3 317	343.7	365	13,031.0	496.86
Senior Four-year-old						
Pinedale All Gold	G. D. Hall & Son, Otorohanga	4 211	369.6	365	12,189.0	534.21
Mature						
Horotiu Cherry	W. Marshall, Taranaki	5 341	385.0	365	13,275.2	640.52

305-DAY DIVISION—FIRST CLASS.

Jerseys.

Junior Two-year-old						
Carrington Lady	L. C. Jennins, Lepperton	2 53	255.8	305	5,347.9	341.24
Ronaki Greta	H. A. Madill, Tuakau	2 34	253.9	305	6,814.2	303.28
Jacks Clover Flower	E. Wright, Redvale	2 84	258.9	305	5,123.6	289.20
Punawai Dentelle	V. Le Cren, Fairlie	2 59	256.4	305	4,681.9	284.34
Three-year-old						
Kiteroa Gamboge Nellie	W. C. Graham, Henderson Valley	3 98	296.8	304	6,867.0	374.42
Kupata Wendy	Tizard Bros., Kopu, Thames	3 59	292.9	234	6,079.9	317.69
Four-year-old						
Ebors Lady Orange	R. J. Wilson, Putaruru	4 53	328.8	229	10,071.3	560.38
Ronaki Jewel	H. A. Madill, Tuakau	4 107	334.2	305	8,814.5	402.55
Beaulieu Lady Cora	Dr. G. Walker, Maunu, Whangarei	4 74	330.9	305	6,779.7	391.26
Ronaki Treasure	H. A. Madill, Tuakau	4 97	333.2	305	7,330.9	375.66
Mature						
Kupata Coin	Tizard Bros., Kopu, Thames	5 36	360.0	305	9,441.3	499.08
Crestdale Lona	A. R. Bayly, Omata, Taranaki	8 6	360.0	301	8,819.2	483.78

Friesians.

Junior Three-year-old						
Lucernvale Burkeyje Beauty 2nd	R. H. D. Hudson, Burwood, Ch'ch.	3 96	296.6	293	9,506.7	395.98
Mature						
Longbeach Transvaal Star 11th	J. H. Grigg, Ashburton	10 42	360.0	281	16,744.3	685.83

Ayrshires.

Mature						
Greenfields Regina II.	C. E. C. Webb, Levin	9 0	360.0	289	9,829.8	479.66

305-DAY DIVISION—SECOND CLASS.

Jerseys.

Three-year-old						
Kupata Idalia	Tizard Bros., Kopu, Thames	3 54	292.4	305	10,172.7	514.47
Mature						
Vanguard's Rose	H. A. Madill, Tuakau	6 34	360.0	305	8,328.9	400.32

Ayrshires.

Mature						
Greenbank Tulip	D. M. Walker, Waikiekie	9 291	360.0	305	10,320.8	437.97

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MILKING TIME
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MILKEEZE

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WONDER'S TONIC PROPERTIES ARE SOON DEMONSTRATED BY HEALTHY AND VIRILE STOCK, AND ASSIST IN SAFEGUARDING AGAINST THE RAVAGES OF THE DISEASES WHICH ALMOST INVARIABLY ATTACK ANIMALS IN LOW OR WEAKENED CONDITION.

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Agents Throughout New Zealand.

Veterinary Notes for the Farmer

Discussions on First-Aid Measures

Contributed by the Livestock Division

Winter Feeding of the Dairy Herd For Town Supply

WITH the advent of winter feeding of dairy cows, more particularly in regard to winter milk production in the towns and cities, the necessity for a constant supervision of the feeding of the herd is important. Many farmers try to produce crops to fill in the period of grass scarcity, but in many cases this is not possible and a certain amount of hay and various concentrates is used in an endeavour to maintain production in this class of herd.

It is necessary to use judgment in the feeding of concentrates; a mixture of grains invariably gives better results than the use of a single cereal. The feeding stuffs in common use as concentrates may be barley-meal, pollard, bran, linseed-meals, or cakes, other concentrated cakes, crushed oats, and occasionally maize, peas, beans, etc., used whole or crushed.

While the use of a single concentrate may give rise to digestive trouble, the mixture containing the same concentrate in association with others may prove quite suitable. In this respect bran has proved itself a most valuable foodstuff in the feeding of dairy cows. Bran is laxative in its effect, tends to prevent digestive trouble when too much pea-meal or bean-meal is being fed, and is excellent for milk production.

If a ration of concentrates is being fed twice daily to the animals attention must be paid to the intake of roughage in the diet. In the ruminant this must always be considered, as bulk forms a part of the ruminant's make-up. Rumination must be maintained, and the bulk of the diet may be composed of grass roughage, soilage from various catch crops, or from a good quality of well-saved hay.

Feeding Hay

Where hay has to be purchased for winter feeding and winter milk production it is advisable to purchase only good-quality lucerne or clover hay. Cheaper, badly-saved fodder or mouldy, dusty, or excessively weathered hay will not assist in milk production, and may actually do harm through setting up indigestion and impaction.

Too much concentrate and too little hay or other roughage may prove as dangerous for the animal's health as too little concentrate and too much poor-quality hay. Frequently, the latter position obtains, and if a low-quality fodder must be used it is advisable to provide a salt lick to assist in digestion. The addition of a watery solution of molasses to the poor hay will assist in rendering it more palatable, more digestible, and more laxative, and will assist in the prevention of cases of indigestion and impaction.

When hay feeding is the general practice it is necessary to see that every animal has a plentiful supply of clean pure water within easy reach.

Indigestion and Impaction

If the feeding is adequate the dairy cows will be able to maintain the milk yield required and will not seriously lose their condition. If the animals are losing condition rapidly it is evident that the feeding is inadequate to maintain production and the flesh on the animals—in other words, the cows are producing at the expense of their own condition. The inherent milking quality of the animal must be taken into consideration and every care taken to preserve it. If the feeding standard cannot be improved, such factors as the provision of shelter from cold, bleak winds and the provision of covers should be considered.

Well-fed, healthy animals are contented and regularly cudding at times

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A double strength Carbon Tetra-chloride drench, with a dual purpose, eradicating both fluke and stomach, blood-sucking, and intestinal worms in one operation—thus avoiding additional handling. Cost per lamb: One-sixth penny per dose; Sheep: One-third penny per dose. One gallon doses 1,800 lambs, 900 sheep. Compounded of purest ingredients—29/- gallon; 15/6 half-gallon. For full details and interesting information, write:

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between feeding or even in the milking shed. The eye appears bright and full, and the nose appears moist and covered with beads of dew. The coat appears normal, and the skin is soft and pliable.

In indigestion due to impaction the animal sooner or later stops cudding. There is an appearance of fullness in the left flank region, the nose becomes dry, the animal groans and eventually a distinct grunt is heard, and the coat becomes dry and harsh. Feeding is intermittent or ceases altogether, and the animal may appear constipated or at times may have a foetid diarrhoea for the time-being. The back of the animal may be arched, and the general appearance is that of a sick animal.

The treatment of such an animal consists in keeping the animal warm, by cover or in a shed. A full dose of laxative medicine should be given. The dose may be prepared by mixing three-quarters of a pound of salts and one ounce of powdered ginger in a quart of warm water in which from 1 lb. to 2 lb. of molasses has been dissolved. The affected animal is carefully dosed and allowed plenty of water, but no solid food until the position improves. As the appetite returns, a bran mash will prove both nourishing, easily digested, and laxative. Some green feed may be given in limited amount if available.

In most cases, if reasonable care is exercised, it will not be necessary to repeat the drenching; in fact, this course is not recommended. It is preferable to follow the drench with a powder composed of half-an-ounce of carbonate of ammonia and half-an-ounce of powdered gentian root. This powder is mixed in a quart of cold gruel or water and may be given at six-hour intervals until the animal has recovered.

Foreign Bodies in the Feed

Foreign bodies may be present in hay when baled hay is being fed to dairy stock. It is important to see that all the pieces of wire are carefully removed from the hay bales, especially the small pieces. If a small piece of wire is accidentally swallowed by the cow there is always the risk of the animal being affected with pericarditis. Foreign bodies, of whatever nature, tend to lodge in the honeycomb or second stomach. If the body is composed of metal it tends to penetrate the anterior wall of the stomach, pass through the diaphragm, and puncture the sac surrounding the heart, thereby carrying infection and setting up inflammation of this sac, the condition being known as pericarditis.

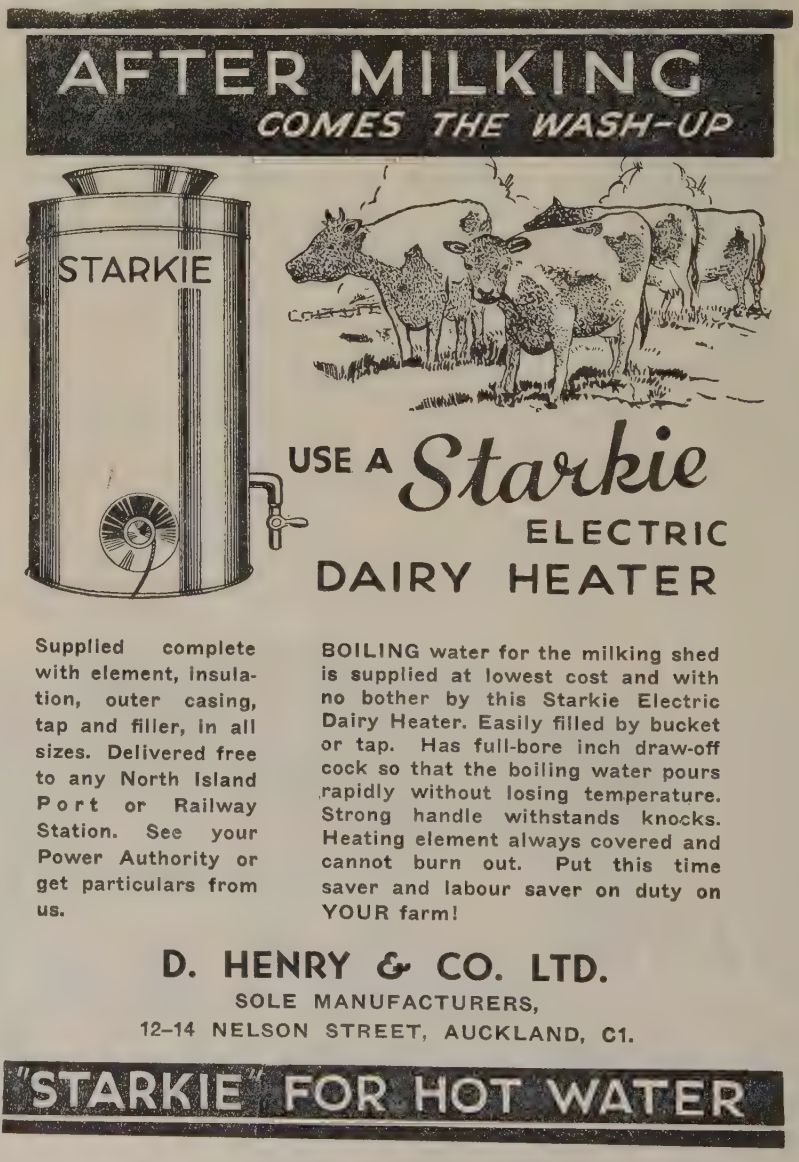
In the early stages such animals are often considered to be affected with indigestion, as the symptoms are very similar. There is a decided grunt or lament from the animal, and walking and movement cause pain, especially on a decline. The affected animal does not feed, and is inclined to stand in the one place for hours on end. After a few days a prominent clinical symptom is an oedematous swelling of the brisket, the jugular furrows of the neck, and even extending under the jaw. At this stage it will be apparent that the animal is not going to recover, and slaughter may be decided upon. As the big majority of affected animals die, it is obvious that the preventive aspect is most important.

Answers to Correspondents

Chronic Indigestion In a Cow

J.P. (BANNOCKBURN):—

Please let me know what was wrong with one of our cows. It was milking three months, and one morning it developed what we thought to be milk fever. We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Supplied complete with element, insulation, outer casing, tap and filler, in all sizes. Delivered free to any North Island Port or Railway Station. See your Power Authority or get particulars from us.
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pumped the udder up and it walked away all right, but afterwards it blew up on one side (always the left one), and about an hour afterwards it would go down and would be all right, although very empty looking. No matter what the pasture was like it would still blow up; sometimes it would be the morning and sometimes at night. Also, she went right off her milk. Her eyes seemed to sink into her head, and at times she would try to kick at her stomach. This kept up for three months, and then she came in the morning blown up on both sides. She remained like that all day, and next morning she was dead. I would like to know through you what was the matter with her.

LIVESTOCK DIVISION:—

It is most difficult to know the exact cause of the illness and death of your cow. If an examination had been carried out at the time it is possible that you would have found that this animal was affected through swallowing a foreign body of some sort, probably a piece of wire, nail, bone, or foreign matter of this nature. It is apparent the animal was affected with a chronic recurring indigestion, probably due to adhesions caused by the penetration of the stomach by the foreign body. The symptoms of indigestion and kicking seem to support this explanation as the cause of death.

You do not state whether you punctured the stomach with a knife or trocar and cannula when the animal was first blown. If this took place and some of the food escaped through the puncture wound, perhaps an area of local peritonitis was set up. Adhesions in this area would also account for the repeated attacks of hoven, and chronic indigestion of this nature would result in loss of condition, loss of milk, sunken eyes, etc. If the animal was not punctured, the former is the most likely cause of death. In many such cases the foreign body can be recovered and demonstrated when a careful post-mortem examination of the abdominal organs is carried out.

When foreign bodies are accidentally swallowed in the food by cattle a common first symptom is indigestion of a chronic nature. The course frequently taken by the foreign body is puncture of the anterior wall of the small second compartment of the stomach, where the body becomes arrested. If a sharp object is concerned the movements of the stomach cause the body to continue in a forward manner, penetrating the diaphragm and sac surrounding the heart where inflammation of this sac is set up. This is known as pericarditis. At this stage there is considerable interference with the heart and circulatory blood system, and a common symptom is an oedematous swelling of the breast, extending up both sides of the neck and under the jaw. The animal is seen to be suffering acute pain, the milk yield decreases and disappears, the eyes become sunken, feeding and rumination are suspended, and the animal lingers for a number of days before death supervenes.

If these symptoms were not seen in your animal, it is quite possible the foreign body took some other course, probably puncturing some other vital organs.

Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Sore Mouths In Lambs

"ENQUIRER" (NELSON):—

Please give me some information concerning the treatment of lambs affected with sore mouths.

LIVESTOCK DIVISION:—

The condition of the lambs described in your letter would suggest that they are affected with a virus disease of the lips and mouth, known under various names, such as sore mouth, scabby mouth, or contagious ecthyma. When dealing with a small number of lambs it is comparatively easy to treat them individually by cleaning the areas involved and then applying a dressing of a mixture composed of 1 part of tincture of iodine in 2 parts of glycerine. This application tends to dry up the affected area when the thick crusts and scabs fall away, leaving a clean, pink skin underneath.

In connection with this disease it must be remembered that it is highly contagious, and where outbreaks occur year after year on any property it is advisable to vaccinate the lambs against the disease. A vaccine is prepared at the Animal Research Station, Wallaceville, and advice will be given as to the method of vaccination to be carried out.

The vaccine is effective in setting up an immunity which will last for several months. As the condition causes a severe check to lambs, it is of considerable economic importance to be able to vaccinate and protect the larger flocks against the disease.

Pulpy Kidney Vaccine

(Entero-Toxaemia)

ORDERS for entero-toxaemia vaccine, made at the Commonwealth Serum Laboratories, Parkville, Victoria, are now being filled by the Animal Research Station, Wallaceville, where stocks are held for New Zealand requirements.

Farmers who are considering the vaccination of their ewes this season are requested to write at once for particulars and prices, if their order has not already been placed. Mention the number of ewes to be vaccinated, and also the date lambing will commence.

Particulars and order forms are obtainable from any Inspector of Stock, the Department of Agriculture, or from the Superintendent, Animal Research Station, Private Bag to Wallaceville, Wellington.

Useful Milking Shed Feed Box

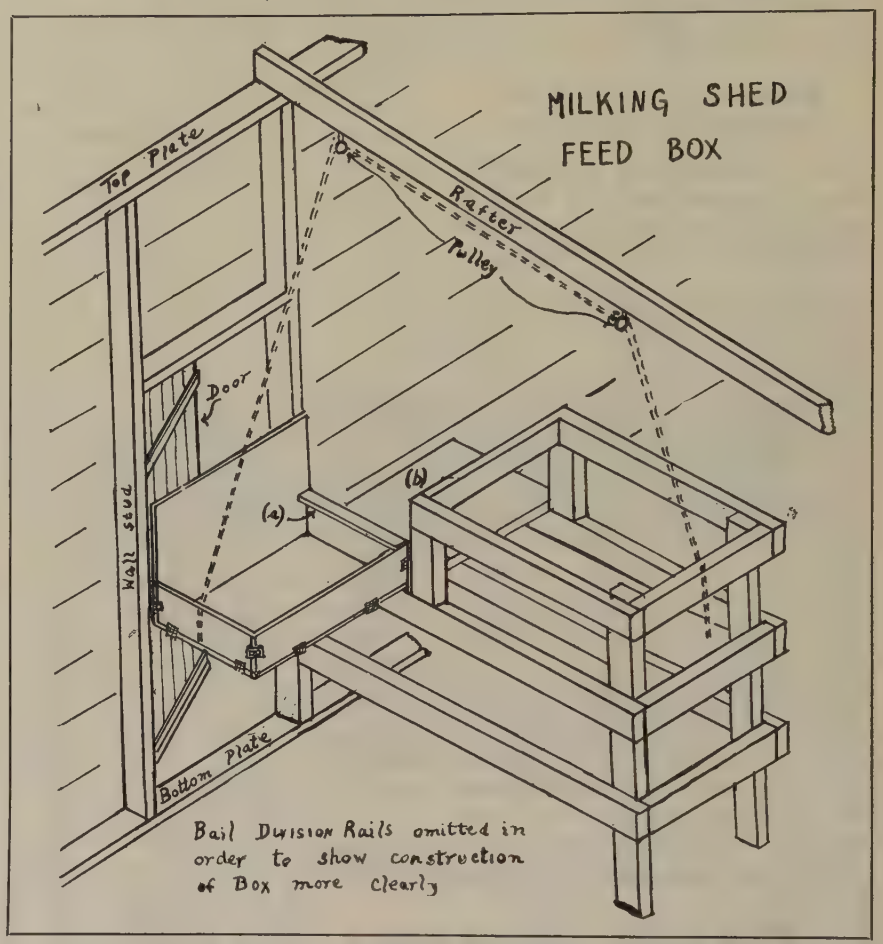
A HANDY and efficient method of feeding milking cows without waste in a run-through shed has been devised by Mr. T. Comber, of Gate Pa, Tauranga.

In the majority of bail feed boxes there is a considerable wastage through feed dropping on to the floor, especially when the boxes are a fixture in the dummy bail.

The method adopted by Mr. Comber eliminates this waste, in addition to being convenient for refilling.

About 1 ft. by 9 in. wide of the top rails of the dummy are cut away from the wall stud, as shown in the accompanying sketch. Boards (b) are nailed across the middle rails, and to these the boxes (one on each side of the dummy) are fitted by means of strap hinges.

Two small, single pulleys are fixed to a rafter and a cord run through them to the outside lower edge of the feed box. This arrangement enables the box to be tilted clear before the cow is released, and a cleat of 3 in. by 1 in. secured to the division rails between the bails acts as a rest for the free edge of the feed box when in use.



In the construction of the feed box, light timber about ½ in. thick is used, and the joints are strengthened by the use of small angle pieces cut from galvanised iron and screwed to the box.

The high back, which prevents wastage of feed, should be 8 in. less in height than the width of the dummy bail.

The 2 in. strip (a) at the dummy bail end of the box prevents the spilling, which might otherwise occur when the box is tilted into the upright position, of any feed left by a cow.

The other dimensions of the box are:—Outside depth, 6 in.; outside length, ½ in. less than the width of the bail proper; outside width, 2 in. less than the width of the cut-away portion of the dummy bail. This last measurement should be particularly noted, as it allows the boxes to be so fitted that the high backs overlap when both boxes are tilted and also allows clearances between both the wall stud face and the dummy.

—M. W. WATT, Inspector of Stock, Tauranga.

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GOVERNMENT LIFE
TO-DAY

Farm Practice and Management

Contributed by Officers of the Fields Division

Useful Weights for Hay Stacks

PRACTICALLY every haymaking season sees a last-minute rush to find material for the weighing-down of the stacks. Usually, anything that is heavy and handy is used, resulting in a motley array of weights around the various stacks. Materials commonly used are old posts, bits of broken implements, lumps of rock, tins of soil or manure sacks filled with soil.

All of these are valuable up to a point, and do the job quite well provided they can be found when required and provided they last long enough. Even so, these materials, being of comparatively little value, are liable to be left round about the stack or thrown into the nearest hedge for the meantime, thus becoming a possible source of danger through injury to stock or implements.

The concrete blocks used for weights on a hay stack. Note the horseshoes to which the wires are attached.

In addition, the annual wastage of good manure sacks must be considerable through this practice. At the present time manure sacks should be conserved as carefully as possible.

To overcome these objections a local farmer made a number of concrete blocks for this purpose, and has used them as shown in the accompanying illustration. The shape is of very little importance as long as they are heavy enough. Those illustrated are approximately 1ft square and 4in deep, and weigh about 50lb. each.

An old horseshoe has been set in each block for attaching it to the wires going over the stack. Of course, any type of hook would be sastisfactory for this purpose, but the horseshoes have the additional advantage in serving as handles when it is necessary to move them—a point worth consideration.

—S. H. SAXBY, Instructor in Agriculture, Dunedin.

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Control of Gorse by Crushing

IN a recent article in this "Journal" Mr. J. E. Bell discussed the effect of controlled cattle stocking in stamping out seedling growth of gorse after burning and the subsequent cutting of any unburnt growth. The concentration of cattle brought about by the feeding of good hay on the affected areas had resulted in the successful establishment of a good sward.

A good deal of concern is caused to farmers in the Southland Province by the spreading of gorse hedges, which in most cases have been neglected at some stage in their life. However, it is generally found that the spread is not into the fields but on to the roadways, which are in many cases two chains wide, although the actual metalled portion may be barely sufficient for two vehicles to pass.

It is evident that the spread of gorse in the field is directly associated with low sheep-carrying capacity. Where the carrying capacity is two sheep per acre little gorse spread takes place, and where this is doubled practically no spread occurs.

Fig. 1.—The spread of gorse on to the roadside from a neglected hedge.
[*S. H. Saxby, photo.*

On the Roadside

The position on the roadside is totally different. The long acre is unstocked and unimproved, and gorse spreads unchecked, as in Fig. 1. The legal position calls upon the farmer to keep this area clear of gorse up to the centre of the road line. Consequently, many miles of gorse hedges forming boundary fences to roadsides have been sacrificed in recent years, and the shelter so destroyed has, unfortunately, been all too infrequently replaced by the farmer concerned.

Fig. 2.—Roadlines ploughed to destroy gorse. The land on the left side has been worked.
[*S. H. Saxby, photo.*

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Quite often, however, farmers obtain permission from the County Council to plough their roadlines which are affected in this manner. Fig. 2 shows the right side of the roadline ploughed, while the left side has been worked down to some extent. There is no doubt that the total destruction of the natural grasses actually increases germination of the gorse seedlings.

Ploughing has to be repeated every second year. It would appear to be sound policy to sow down with a form of couch, such as creeping fog, *Poa pratensis* or browntop, which would take possession and prevent seedling gorse-establishment.

Apart from the above, there is another method of control which has found an increasing number of adherents. This is crushing by means of the tractor. Many years ago in the Waianawa district a farmer who owned a threshing mill pulled it by means of a traction engine along the gorse-affected edge of the road. This machinery used to pass perhaps four times over the same track during the threshing season each autumn. As a result the track was cleared of gorse.

Fig. 3.—Gorse on the roadside which has been crushed by tractor.
[S. H. Saxby, photo.

In Fig. 3 is shown gorse crushed by means of a tractor of the wheel type. Tractors of the caterpillar type are equally successful. By using this method the sward on the roadside is not destroyed but is allowed to build up, and, if persevered with, the gorse itself decreases.

—A. STUART, Instructor in Agriculture, Invercargill.

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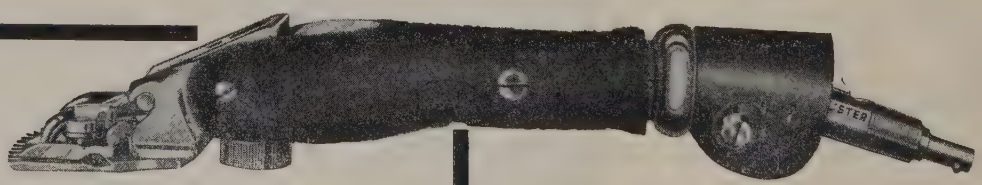

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Efficient Cattle Dehorning Crush

THE importance of proper facilities for handling cattle on high country farms, where store cattle play such an important part in fern and pasture control, is often overlooked.

Good, strong yards are essential for handling these high-country cattle, and a good dehorning crush is an important part of these yards. If farmers could see the wastage caused when horned cattle are railed or driven to a freezing works they would soon realise that they are losing many pounds through their stock being rejected for bruises, old scars, and other damage caused by horns.

Mr. E. Coogan has a very handy crush in which is incorporated many novel features.

Fig. 1. — A general view of the crush with both release gates open.

Fig. 1 shows a general view of the crush with both release gates open. The idea of the two gates is for handiness in branding cattle. For this operation the top gate is opened to enable a man, standing on the ground, to manipulate the iron.

Fig. 2 shows the bale for holding the animal's head. It will be noticed that a weight is attached to the lever to bring the arm back to the upright position when released. Another interesting feature is the short rails across the top of the crush. These are easily removed, and are adjustable to prevent small cattle escaping, as they would if the whole end were open.

Fig. 3 shows the crush closed and the top gate open. As can be seen, the crush lever is pulled down with a rope and pulley and held down by a bolt. This rope may seem unnecessary, but it has proved very useful in handling big cattle, when a toss of the head may injure the man who is trying to close the bale.

—*W. T. BROWN, Fields Instructor, Taumarunui.*

Fig. 2 (left). — The bale for holding the animal's head. Fig. 3 (right). — The crush closed and the top gate open.

NATIONAL CENTENNIAL ONE-ACT PLAY COMPETITION

As part of its programme of Centennial Celebrations the Government is undertaking in collaboration with the Centennial organisation, a National festival of community drama.

Organising bodies for the competitions are as follow:—

AUCKLAND PROVINCE:—
The Auckland Drama Council. Secretary, Mr. M. Lusty, 7 Wanganui Avenue, Herne Bay, Auckland.

WELLINGTON, TARANAKI, HAWKES BAY, NELSON and MARLBOROGH PROVINCES:—
British Drama League, Wellington. Secretary, Mr. F. V. Sanderson, 18 Roderigo Road, Kilbirnie, Wellington.

CANTERBURY and WESTLAND PROVINCES:—
British Drama League, Timaru. Secretary, Mr. A. E. Lawrence, Le Cren Street, Timaru.

OTAGO and SOUTHLAND PROVINCES:—
British Drama League, Dunedin. Secretary, Mr. Douglas, Altom Avenue, Musselburgh, Dunedin.

The competition is open to all interested in the production of one-act plays. Local competitions will be held, followed by semi-finals in the four centres, and culminating in a Grand National Drama Festival to be held in Wellington on or about 25th July.

Prizes for National Final Winners:—
FIRST, £50 SECOND, £25

Locomotion expenses of teams participating in the National Final will be paid.

Information as to rules, etc., may be obtained from the Provincial Secretaries listed above, from any area in the British Drama League, or from The General Secretary, Centennial Branch, Dept. of Internal Affairs, Wellington.

The Orchard and Vineyard

Contributed by the Horticulture Division

Orchard Notes

Preparations for the Pruning

WITH the completion of the harvesting season approaching, preparations should be made for an early start on pruning operations. Much detail work is often required on bearing trees to secure the desired results in cropping, much more than many orchardists have found possible to accomplish. Unless an early start is made and full advantage taken of fine weather the work may become so protracted as to hinder the essential spring work of ploughing, cultivation, and applying the early sprays, or else only a partial job can be managed.

In mixed orchards some immediate progress may be made with the stone fruit trees because of the earlier defoliation, leaving all the time possible for the pip fruits when they become ready.

With such a big undertaking as the pruning of a fair-sized commercial orchard it is necessary to give some consideration to reducing costs or getting the most out of the time devoted to this work. Proper tools and equipment are the first essential.

Ladders and Tools

First of all, it is necessary, particularly on large trees, to be able to work around them easily. Light but strong orchard ladders of several sizes give comfort, security, and speed to the pruner, and are very necessary. Good types of orchard ladders were illustrated in the December, 1938, number of the "Journal." Pruning secateurs must be kept in good condition, and with the "roll-cut" type, spare parts should be kept on hand and used.

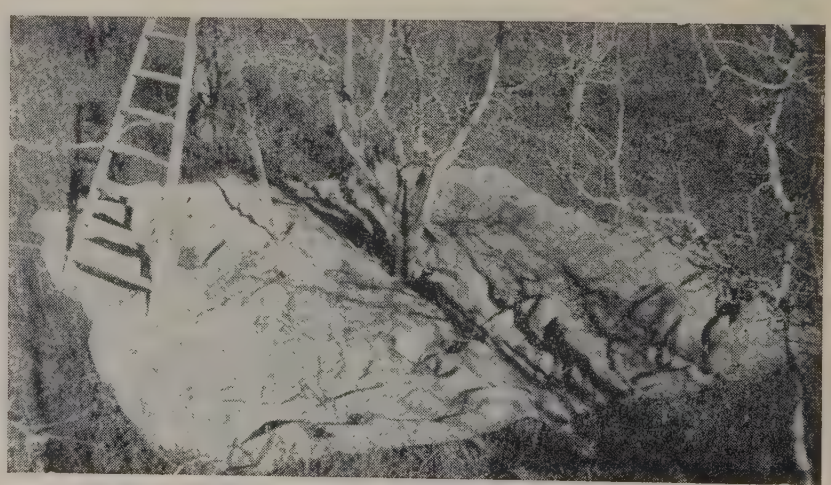
Unless carefully handled, trees eventually reach a stage when quite heavy thinning out by removal of leaders and secondary arms becomes necessary. This means the free use of a pruning saw. This work may become very laborious unless a really good pruning tool is used, but quite frequently the work is attempted with saws of unsuitable type and condition.

The most popular type—and one which may be used with the greatest ease—is the saw with a thin adjustable blade set in a metal frame after the style of a hack saw. From the point of view of securing a clean cut without bark injury and rapid healing this type of saw is also desirable.

Pruning Sheets

The use of pruning sheets saves much time in cleaning up prunings, a very irksome job. Pruning sheets are best made in two pieces 18ft x 9ft. The two pieces are placed on the ground on opposite sides of a tree and are brought together to form a square 18ft x 18ft directly beneath the tree. This is sufficient to catch ll prunings from fairly large trees.

Materials in common use are heavy-grade hessian and tent canvas. Improvised sheets may also be made from opened-up sacks sewn together. To lessen the work of handling the sheet on the ground four or five loops of the material may be attached to each end, through which a strong pole may be threaded for dragging purposes. In dragging from tree to tree, the sheet will remain flat and can be handled with ease by one man.



A pruning sheet beneath a fruit tree.

Wound Dressings

Large wounds are sometimes inflicted on trees in pruning through the removal of crowded limbs or severing broken branches. It is very necessary to dress all large wounds in order to accelerate the healing process and to prevent the entry of silver blight or other disease organisms.

Some form of bitumen paint is the most suitable material for the purpose. This is particularly important with stone fruit trees, and is the only means by which the heavy loss through silver blight can be reduced.

Framing Young Trees

Pruning is necessary in the earlier life of a tree solely for the purpose of securing a stronger framework and some symmetry in design to make for easier handling. Later, the pruning is designed to take care of the fruiting wood, to regulate cropping, and to maintain a sufficiently vigorous state in the tree.

Pruning in the earlier stages consists mainly of the removal of surplus shoots after selecting those required for the main framework. No more than six main leaders should be developed in a tree. These should be secured by the second year. Extension in the first two years should not be too rapid, and may be controlled by shortening the leading shoots to half their length at each winter pruning.

By doing so, the lower framework is broadened and strengthened, height is kept within proper limits while the tree is developing anchorage roots, and the requisite number of leaders is secured by causing a duplication at each cut. From this point, extension may be more rapid and according to the vigour of the tree.

Peaches and nectarines may extend more rapidly than apples or pears, and after the second or third year should require little more than a thinning of surplus heavy shoots in developing a fairly open, strong framework.

Most of the pruning carried out is in treating bearing trees, and the intensity of the pruning must vary greatly according to the age and condition of the tree, and also the variety and kind of fruit. The general principle is to prune lightly trees which are making vigorous growth and still extending in size, while trees carrying heavy crops and making poor to only moderate growth require very detailed treatment of fruiting wood by removing much of the weaker and spent wood, shortening extended laterals, and by various means reducing the potential blossom buds. This, in effect, reduces the number of fruits likely to set, but increases the average size and improves the market quality.

Peaches and Nectarines

Both peach and nectarine trees produce fruit on one-year-old shoots. Consequently, a fairly heavy pruning is required each winter to force new fruit-bearing wood. Laterals of a previous season's growth extend from the end and form other shoots nearer the base if the tree is healthy.

The practice is to cut such laterals back in order to retain only the lower shoots. The removal of laterals should be so extensive that not more than a

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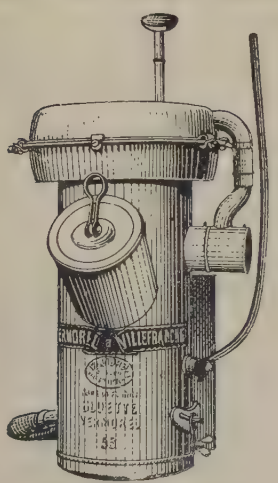

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moderate blossoming can occur. Much fruit thinning is thus avoided, and larger and better fruit is produced.

The natural habit of the peach is to carry its bearing higher each year, leaving unfurnished non-fruiting branches in the lower framework. Thinning out the top growth is necessary to allow sufficient light to reach all parts so that new growth is encouraged lower down.

Apricots

The apricot produces the bulk of its fruit on fruit spurs which are short-lived. A relatively small part of the crop is produced on one-year-old shoots. Pruning must be designed to cause the continued renewal of the fruit-spur system. A fairly vigorous growth should be maintained in the tree, and in older trees a more severe cutting back and thinning out will be necessary when only short growth is resulting from the usual pruning.

Cherries

Cherries are produced on long-lived spurs, and therefore less renewal of fruiting wood is required. Once the tree has been built and cropping begins, little pruning is necessary to maintain it in a fruitful state. Proper condition of soil is the essential factor in keeping a cherry tree healthy and fruitful, and no form of pruning alone will make up for any deficiencies in this respect.

Japanese Plums

Japanese plums are prolific bearers, and produce fruit on short, thick spurs, mostly on wood two years and older. A small proportion of the crop is produced on strong one-year-old wood.

Because of their prolific bearing, and as only large fruit is of commercial value, fairly heavy pruning must be resorted to each year in order to reduce the fruits in number and to induce sufficient new growth. The pruning should consist of a general thinning-out by the total removal of many of the strong one-year-old shoots, in addition to the shortening-in of many of the two-year and older shoots retained for fruiting.

—N. J. ADAMSON, District Supervisor, Nelson.

Citrus Notes

Selection of Suitable Trees

IN last month's notes the attention of intending planters was drawn to certain aspects of citrus culture which should be known before planting. Among these factors, and one of the keys to success, is good trees. If possible every planter should personally inspect and choose the trees.

As a guide to such choice, the following items require consideration:—Rootstock, budwood, height of budding, length of main trunk, and the general health and vigour of the trees. Citrus rootstock investigations are at present being undertaken by scientific workers in this country, and, until results are available, the intending planter must be guided by general observations in the locality in which he intends to plant. If good results are being obtained, then adhere to that rootstock; if unsatisfactory results, then consider other stocks available.

At present the sweet orange *(Citrus sinensis)* is recommended for most localities for sweet orange, New Zealand grapefruit, and lemon plantings. Attention to drainage is important with this stock or collar-rot is liable to become a major problem. The rough lemon *(Citrus limonia)*, often known locally as Citronelle, gives a large tree in a short time. It must be placed as second to sweet orange, and, although quite suitable for lemons, is to be regarded with caution for New Zealand grapefruit and sweet oranges.

Poncirus trifoliata is outstanding as a stock for producing quality fruit. It generally has a tendency to produce a smaller tree unless a vigorous scion is budded to it. If employed, plant trees closer together—approximately 16 feet should suffice—and be sure that by irrigation or otherwise an adequate supply of moisture can be maintained over the summer months.

Budwood

Budwood should have been obtained from quality trees, and any information regarding the source of the budwood should be noted. Trees should be budded 6 inches from ground level, and the main trunk should be 18 inches from bud union to fork. The foliage and general appearance of the tree should be healthy and vigorous.

The question naturally arises: What is to be done if trees up to these specifications cannot be obtained? Do not plant the second best unless the fault is only a minor one. It is better to delay a season or two and have trees up to specifications than to plant inferior trees. Good trees planted a year or two later will soon outstrip poorer trees planted now. A nurseryman prefers to be advised well in advance as to the trees a planter will require.

Careful Harvesting

With mature orchards the main picking season of the year is approaching, and emphasis must be laid once more upon careful harvesting of citrus fruits. Pick whenever lemons are up to size—namely, 2¼ inches, or light to silver green in colour. Any tendency to pick too small is to be deprecated. Such small green fruits are quite unsuitable for curing.

Whenever the effects of colder weather result in the colouring of lemons, these fruits should be picked immediately. No more than three to four weeks should elapse between pickings at this season of the year. If unskilled labour is to be employed during the peak crop months of the year it is highly desirable that the owner should instruct such employees in the technique of thorough and careful picking before serious damage is done through ignorance.

Tree Records

Another matter which can be mentioned now, just before the main harvesting season, is the necessity for better tree records. One or two days

spent on crop estimates will amply repay the owner of any citrus orchard. Such estimates should be on a tree to tree basis, and require careful recording. Rows should be numbered from the most convenient point and each tree numbered in the row. When such an investigation is made it is generally a surprise to find the number of inferior trees which are lowering the average output of the orchard.

Citrus-borer, bark-blotch, red-scale, or thrips may be affecting certain trees, which will require special attention in addition to that given the rest of the trees in the orchard. "Off-type" or otherwise inferior trees are often allowed to remain in an orchard long after the owner realises their presence and uselessness, and yet fails to act. If in doubt, mark the tree in a distinctive manner; record its approximate crop at each picking over the next three or four months, and, having given additional attention, judge results.

With a grove of sweet orange or New Zealand grapefruit trees, such a survey can be more readily carried out just before harvesting the first of the season's crop. Such records of quality and quantity should prove of great value to work on citrus bud selection, which is necessary for the improvement of our locally-raised citrus trees.

—A. M. W. GREIG, Citriculturist, Auckland.

Cool Storage Notes

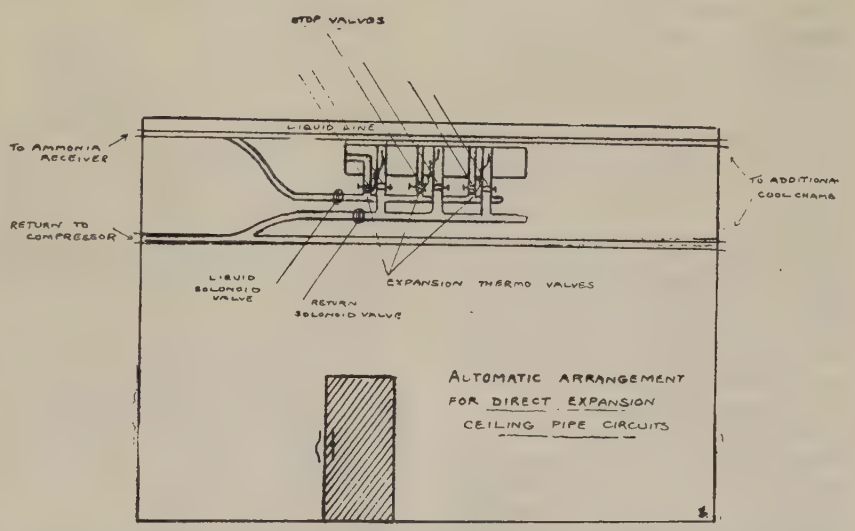
Automatic Control for Direct Expansion Ceiling Pipe Circuit

THE automatic control of a fruit cool storage plant is one of the more modern improvements in cooling equipment which is available to cool store owners. The electric equipment now being manufactured for this work is highly efficient and dependable. Although the initial monetary outlay involved in its installation may seem rather high, this is offset by the saving in time effected, as very little attention is required to keep the automatic equipment in good running order.

Other advantages in the installation of this type of cooling plant are that each of the chambers may be automatically held at different temperatures, and the temperature fluctuations are reduced to a minimum.

When ceiling coils are fitted with automatic control apparatus a perfect distribution of cooling is obtained. A thermostat in each chamber is set to the required temperature range. This apparatus automatically controls the starting and stopping of the plant and the opening and closing of solonoid valves, which are fitted in the liquid and return ammonia headers, thereby making possible the full automatic control of a cool storage plant.

The accompanying sketch shows the liquid and return ammonia headers for three pipe circuits, through which the expansion of ammonia is automatically controlled by the thermostat in the cool chamber.



Sketch of the front of a cool chamber showing the headers and three ammonia pipe circuits with 600ft. of 1¼in. pipe in each circuit, automatically controlled by solonoid valves which are operated by a thermostat in the cool chamber.

A careful examination of Jonathan apples held in cool storage should be carried out, and all larger sizes than 163 should be disposed of first. This applies to most varieties of apples held in cool storage. The larger the fruits the greater the loss when deterioration begins to show up. With this in view, fruit intended for long storage should be specially marked to enable the large to medium counts and medium to small counts to be stacked separately in cool storage chambers.

Fruit which was over-matured before being placed in cool storage should receive constant inspection, and should be held for only a short period in cool storage. Extra-fancy grade fruit should be kept under observation, as this grade may be well advanced in maturity when placed in cool storage.

Early varieties of apples should be disposed of in time to get the long storage varieties into the cool store before they become over-matured.

Fungal rotting and deterioration will develop in lines of fruit if they are allowed to become too fully-matured before being placed in cool storage, and heavy losses will occur when this fruit is held in cool storage even for a comparatively short period.

Ventliation

Regular attention should be given to the blowing out of fruit cool storage chambers. This should be done on cold mornings twice each week, when the chambers are becoming full of fruit, as little accidental ventilation from the opening of chamber doors is taking place, and an excessive concentration of carbon dioxide is likely to become injurious to the stored fruit.

—A. POWELL, Cool Storage Officer, Wellington.

Tobacco Notes

Colouring Mature Green Leaf

MOST growers are left with a quantity of green leaf on their hands at the end of each grading season. Some of this leaf will be sound and mature, and will have a percentage of colour, but not sufficient for its inclusion in any of the commercial grades, while some will be immature with no sign of colour whatever. The latter type should be destroyed during grading operations, as it will never be of any value.

Many growers attempt to force colour into the mature green leaf by restringing it and placing it back in the kiln and alternately steaming and drying it out several times, or by spreading it out on the ground in the open for 24 hours to become dew-soaked and sun-dried and turning it over and repeating the process for another 24 hours. After this treatment the leaf is included and offered in the season's sales.

Both these treatments are unsatisfactory, and at best only produce a leaf of nondescript colour and poor aroma. If accepted by the buyers, it is only as low-grade leaf, for which the equivalent low-grade price is paid. When rejected, which is often the case, the grower is faced with the extra cost of additional handling and treatment, besides the loss of the leaf.

Bulking Down

To obtain better value for mature green leaf (and at very little cost) it should be graded out and set aside during the preparation and sale of the normal crop and then bulked down in the following manner.

Floor space in the driest and best ventilated part of the bulk shed, and situated well away from the walls, should be selected and marked out in an area about 4ft wide and as long as convenient. Tobacco sticks or slats should be laid lengthways, two inches apart, for the whole width and length of this area and covered with brown paper. Thus, a platform 4ft wide and about an inch above the floor is constructed, known as the bulk base.

On this base a row of the matured green leaf may be laid two or three leaves deep, with the tips facing inwards and the butts outwards throughout the length of the platform, the tips of the leaves being about an inch from the centre. A second row is laid opposite the first, also with butts outwards and tips inwards, reaching to about an inch off the centre. Another layer is placed on top of and half-overlapping the first row, butts outward and level with the edge of the bulk on one side, and a similar layer is placed on top of and half-overlapping the second row, butts outward and level with the edge of the bulk on the opposite side.

Completing the Bulk

The layers of rows can be continued in this formation until all the leaf is bulked. It may be necessary to put an extra row in the centre occasionally to keep the bulk level and to make it more compact. A bulk of this description can be built to a height of 6ft or more if required. Light timber frames should be erected at either end of the bulk to keep the leaf from falling out.

When the bulk is completed it should be covered with calico or hessian. Boards should then be laid along the top and weights placed on these boards at intervals, such as bags of fertiliser or lime, or heavy pieces of timber, and the bulk left until the following season.

When bulking tobacco in this way care should be taken that all timber used in the construction of the bulk base is thoroughly dry and matured.

Any "fat" or "wet stem" leaf should be rigidly excluded from the bulk, as the inclusion of one wet stem in a bulk for any length of time will cause serious damage.

If these instructions are followed correctly it will be found when the bulked leaf is opened up the following season that practically the whole of the leaf has coloured sufficiently for it to be marketed at once with the main crop, and it will be of even better texture and quality than the new cured leaf.

—U. A. YELDHAM, Department of Agriculture.

Protection from Birds

THE losses caused by birds eating the young seedling peas as they come through the ground and at later stages may be reduced by several means. Wire-netting, a thin covering of bracken fern, or black cotton suspended above the rows are more or less effective in keeping the birds off. A method which is less troublesome is to dust the rows with ground limestone as the seedlings appear above ground. It is necessary to repeat the application if the original dressing is washed off the plants by rain, and if birds begin to attack the seedlings. While the lime remains the treatment is effective.

—F. SYDENHAM, Assistant Horticulturist.

The Home Garden

Small Fruits and Flowers

The Flower Garden

Ornamental Shrubs and Trees

F. SYDENHAM, Assistant Horticulturist, Wellington.

FROM early May onwards supplies of ornamental trees, shrubs and bushes become available from nurserymen. The hardy varieties should be planted as soon as they can be obtained. This allows them time during the winter to develop their rooting system and become established before growth begins in the spring. The planting of half-hardy and tender subjects that are difficult to establish should be deferred until growth begins in August and September.

In choosing subjects for planting care should be taken, when a succession of bloom is aimed at, to select those which are capable of producing that succession. Before planting a shrub in a piece of ground its ultimate size should be taken into account. In the accompanying classification of flowering trees and shrubs according to their size and season of blooming, the ultimate size, or the size to which it is not difficult to keep the plants by pruning, is given. Those subjects marked (*) will stand only a few degrees of frost.

(1) WINTER-FLOWERING (May-August).

(a) Small Shrubs (up to 4ft.).—Erica, Ephorbia wulfeni, Daphne indica, Grevillea dimorpha and alpina, Thrytomene mitchelliana, Veronica macrocarpa and speciosa.

(b) Intermediate Shrubs (4 to 6ft.).—Calycanthus praecox (or Chimonanthus fragrans), Camellia sasanqua varieties, Cydonia, Eriostemon, Garrya, Grevillea rosemarinifolia, Hammamelis mollis.

(c) Large Shrubs and Small Trees.—Acacia Baileyana and podalriafolia, Bansia ericaefolia, Buddlea salviafolia, Camellia Japonica varieties, Dryandra, Eucalyptus Campbelli, Podalyria grandis, Protea mellifera and susanne, Prunus subhirtella autumnalis and mume.

(d) Subjects Requiring a Warm Situation or a Glasshouse.—Lucullea and Poinsettia.

(2) SPRING-FLOWERING (August to December).

(a) Small Shrubs (up to 4ft.).—Adenandra uniflora (*), Boronia, Ceonothus rigidus, Daphne genkwa and mezereum, Fuchsia, Viburnum carlesi.

(b) Intermediate Shubs (4 to 6ft.).—Abelia Schumanni, Andromeda japonica, Azalea indica and mollis, Cytisus (brooms), Fuchsia, Kalmia, Leptospermum, Philadelphus, Prostranthera, Pomaderris, Romneya, Rhododendron (small varieties), Syringa (lilacs), Weigelia, Viburnum.

(c) Large Shrubs and Small Trees.—Amygdalus, Buddlea, Callistemon, Cerasus, Cornus, Cercis, Cytisus (laburnum), Exochordia, Habrothamnus elegans (or Cestrum purpureum), Malus, Magnolia, Rhododendrons, Sophora, Tamarix, Telopea, Viburnum.

(3) SUMMER-FLOWERING (December to March)

(a) Small Shrubs (up to 4ft.).—Ceratostigma, Cistus, Diplacus, Fuchsia, Grevillea alpina, Hydrangea (French), Lantana (*), Punica nana, Swainsonia.

(b) Intermediate Shrubs (4 to 6ft.).—Abelia Schumanni, Abutilon (*), Ceonothus, Clianthus (*), Fuchsia, Fremontia, Genista fragrans (or Junceum spartium), Hibiscus syriacus (hardy and deciduous), and Hibiscus (*), Lagerstroemia (*).

(c) Large Shrubs and Small Trees.—Albizzia julibrissen, Ceratopetallum (flowers), Clethera, Embothrium, Erythrina (*), Eucalyptus ficifolia (tender in the young stages), Jacaranda (*), Stewartia, Tamarix.

(4) AUTUMN-FLOWERING (March to May)

(a) Small Shrubs (up to 4ft.).—Erica, Diplacus, Fuchsia, Lantana, Swainsonia.

(b) Intermediate Shrubs (4 to 6ft.).—Fuchsia, Grevillea, Junceum, Melaleuca.

(c) Large Shrubs and Small Trees.—Cassia, Ceratopetalum (bracts), Escallonia Montividiensis, Lassiandra (*).

(5) BERRY SHRUBS.

(a) Small Shrubs (up to 4ft..).—Callicarpa (*), Cotoneaster horizontalis, Ruscus.

(b) Intermediate Shrubs (4 to 6ft.).—Aucuba, Berberis, Cotoneaster (height depends on the richness of the soil), Stransveasia undulatum.

(c) Large Shrubs and Small Trees.—Cotoneaster (where the soil conditions are fertile), Crataegus, Euonymus,

What To Do In The Garden Next Month

Summary of Operations during June.

Beginning with this issue, the summary of operations given will be for the month following the issue of the "Journal." This change has been found necessary so that readers may be given a few days to study the following month's programme before putting it into operation. The summary will include a list of operations for the vegetable, small fruit, flower, and glasshouse sections of the home garden.

The list of vegetables in season and in store will also be given so that those who have not these crops on hand may realise that it is possible to have them. The month in brackets after the crop indicates the month when the seeds should have been sown to produce the crop.

VEGETABLE SECTION.

SEEDLINGS TO TRANSPLANT AND PLANTS TO SET.

Seedlings should not be planted out this month.

Shallots may be planted, but with better results in July. Plant early potatoes in frost-free districts if the condition of the soil is suitable.

PERENNIAL CROPS.

There is no special work that should be done. Rhubarb crowns are better planted in July, and asparagus plants in August and September.

CROPS IN SEASON

Greens—Brussel's sprouts (September); cauliflower, winter cabbage, savoy cabbage, borecole and silver beet (all in October); spinach (March, April).

Salads.—Endive (February, March); celery (September).

Roots in the ground.—Artichokes (October tubers); beetroot and carrots (February-March, in warm districts); celeriac (September); leeks (October); parsnip (October and December); salsify (October); turnips (March, April).

CROPS IN STORE.

Beetroot, carrots, kumeras, onions, potatoes, pumpkins, shallots.

GENERAL WORK.

Dig light land, if its condition is suitable, in preparation for planting in warm districts.

Clean, repair and sharpen garden tools.

Place order for seed and manure.

See paragraph "The garden in winter time" in these notes.

SMALL FRUITS SECTION.

Small fruits planted last month will be satisfactory, but it is advised not to undertake further planting until July.

Attend to the pruning of bushes (see last month's notes).

FLOWER SECTION.

Order shrubs and seeds.

The pruning of early-spring flowering shrubs should be delayed until after their blooming period is past. Others which bloom on new growths may be pruned now. With roses, in cold localities pruning should be delayed until the end of August. Pruning generally starts the bushes into new growth, and if done before the severity of the winter is past there is the liability of loss of the buds by frost injury.

The planting of hardy deciduous shrubs and trees may be undertaken. Evergreens and tender shrubs and those deciduous subjects which do not transplant readily are better planted in August and September. Roses which were not planted last month should be planted next month.

GLASSHOUSE SECTION.

Dig under the cover crop four to six weeks before a crop is to be planted.

Flood the house two to three weeks before planting, and leave it undisturbed for the surplus water to drain away.

Towards the end of the month plant out tomato seedlings in the heated house.

---

idecia (25ft.), Malus, Pyracantha, Pyrus (berries in summer), Stransvaesia davidiana.

(6) FLOWERING TREES AND SHRUBS SUITABLE FOR THE FOLLOWING PURPOSES:—

(a) Seaside Planting.—Acacias, Berberis, Buddlea, Cytisus (brooms), Cotoneaster, Dryandra, Escallonia, Euonymus, Garrya, Leptospernum, Metrosideros, Protea. Tamarix, Veronica, Viburnum.

(b) For Exposed Positions.—Acacias, Berberis, Buddlea, Cydonia, Cotoneaster, Cytisus (brooms), Forsythia, Genista, Leptospernum, Veronica, Viburnum, Weigelia, and most berried shrubs.

(c) For Shady Situations.—Andromeda, Aucuba, Azalea, Cotoneaster, Cytisus (brooms), Escallonia, Hydrangea, Kalmia, Rhododendron, Syringa (lilacs), Veronica.

(d) For Positions Exposed to Stock.—A number of these may require protection when they are small. Acacia, Berberis, Cotoneaster, Cydonia, Cytisus (brooms), Eriostemon, Genista, Grevillea, Leonotus, Leptospernum, Prostranthera, Pyracantha.

(e) For Wet Situations.—Very few specimens can be grown in waterlogged soils, but many can be grown on the better-drained slopes surrounding these areas. Taxodium distichum, a deciduous pine, may well be grown in these areas. Its foliage and especially the autumn colourings are most attractive.

The Vegetable Garden In Winter Time.

THE cold, wet conditions prevailing at this time of the year does not offer much encouragement for working in the vegetable garden. It is fortunate that there is not much urgent work to be done. It is not advisable to attempt any form of cultivation on soils of the heavier classes, otherwise pugging or poaching will occur and will require a great amount of careful attention to repair.

This winter period need not be an idle one, for there is much that can be done. The crops in store will require to be gone over occasionally, and any showing signs of decay should be used immediately.

APIARY NOTES

Contributed by Officers of the Horticulture Division

Winter Activities in the Apiary

ALTHOUGH work among the bees will have practically ceased by now, the commercial bee-keeper will still find plenty to occupy his attention. Those who have not yet completed the winter precautions of uniting weak colonies and reducing the space as far as possible should not delay attending to these matters.

While some bee-keepers prefer to leave most of the supers on the hives as long as possible, it is not advisable to have too much space for the bees during cold weather. If some of the supers still contain a little honey which may be of use to the colony the best plan is to put the mat over the second super and place the empty one above it, taking care to leave a corner of the mat turned back to allow the bees access to the honey above. The bees will soon remove the honey below the mat if there is sufficient room to store it. Such supers should be removed as soon as possible in order to conserve the warmth of the hive.

It will be found that it pays to see to the welfare and comfort of the bees.

Marketing the Crop

Bee-keepers with only a few hives do not have to worry much about the marketing of the small crops they obtain, as they can usually absorb most of it themselves, and what remains can usually be placed at satisfactory prices to their friends. Commercial bee-keepers at one time used to spend much time and worry in disposing of their surplus honey in the winter months, and when large crops were obtained throughout the Dominion honey was often sold at so low a price as to make the bee-keeping industry an unprofitable concern.

In these times, however, old-established bee-keepers have a steady market for all they can produce, as the Internal Marketing Department can take all the honey available at a fair price to the producer. This leaves more time to devote to honey production, and bee-keepers will find it the most profitable way to dispose of their crops.

Treatment of Wax

In most apiaries at this time of the year (just after extracting) there accumulates large quantities of beeswax, mainly obtained from the cappings. Now that the busy season is over, the bee-keeper should turn his attention to the proper treatment of his wax. This should be done during cold weather unless he can do the rendering-down in a bee-proof shed, as nothing more attracts the bees' attention, if they are able to fly, than the smell of hot wax, and if the bees cannot be kept out before it sets many thousands of bees will be lost in the hot wax.

A solar wax extractor, if used during hot, sunny days, will make a good job of the capping, but it would be too late at this time of the year to expect good results. Where the solar extractor has been in use during the hot weather, the block can now be scraped to remove any refuse that may be at the bottom and melted in clean rain water. The water should be hot enough to melt the wax without allowing it to boil.

Bee-keepers' Associations

Most bee-keepers, especially those in a large way, find it advisable and profitable to join up with the nearest Bee-keepers' Association. Those who are too far away may become members by joining up direct with the National Secretary.

Plans for Next Season

Now is the time to make plans for the coming season. Beginners with a few hives, having found it a profitable hobby, may desire to increase their stocks. If such is the case the slack days of the winter can be well used in making up hives and frames in readiness for the spring.

—G. V. WESTBROOKE, Apiary Instructor, Hastings.

Garden Notes—*cont. from page 402*

This period offers an opportunity for cleaning up tool and storage sheds, glasshouses, etc., and effecting any necessary repairs. It also affords an opportunity for attending to garden-ing tools. They generally require cleaning, sharpening, and repairing, for it will not be long before the busiest season is with us again.

Those who save their own seed will find opportunity to thresh and clean the seed. All gardeners should study their seed catalogues and order their requirements of seed so that it will be on hand as soon as required. It is always advisable to place orders early when seedsmen are not as busy as later in the season.

Manures should also be obtained at this season.

The light soils of the warmer districts should be cleaned. On these soils, where planting is begun next month, cover crops should be dug under. If this is not completed a month to six weeks before seed is planted there is the possibility that the large amount of ammonia given off from the decaying plants may adversely affect the germinating seed.

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Housing for Winter Egg Production

AT this season of the year there is usually a period of short supply of fresh eggs, and the ruling prices are naturally at high levels. The reason for this shortage in the egg supply is the difficulty experienced in the production of eggs during the cold winter months from the average flock of poultry, the conditions under which many of our fowls are kept for egg production, and the fact that the hens have been going through the moulting process. These hens seldom begin to lay in their second and third season until the end of June. while more often than not the steady production from them does not set in until the latter part of July or early in August.

This is a critical period for most poultry-keepers. They must depend upon their pullets for their source of income, and even though a number of well-reared pullets may be available on the plant, it should always be remembered that the production secured is an out-of-season product and calls for special attention.

Keep More Pullets

Experience has proved that unless a sufficient number of good pullets has been reared in the spring months to maintain a fairly steady egg supply during the scarce egg season, it is difficult to make a success of the business. Those engaged in the industry would be well advised to endeavour to arrange each season to carry about twice as many pullets as hens at this time of the year, provided they have the suitable accommodation for them without overcrowding.

In these days of modern artificial incubation and brooding, it is comparatively easy for the experienced poultry man to arrange to hatch and rear, at the best season of the year, pullets which would bring in a good egg production during the winter months.

Experience Essential

It should not be inferred, however, that poultry-keeping is quite an easy way of making a living, and that all that is necessary is to hatch pullets in the spring with the object of assuring a supply of winter eggs when prices are high. Experience has proved that successful poultry farming is a highly-skilled occupation and that the management of poultry in large numbers is one of the most difficult tasks. Paying attention to the many details in connection with the management of the laying flock is most important in the production of winter eggs, and the great essential for good management is to possess a thorough knowledge of the conditions under which poultry do best.

Environment

Suitable environment plays an important part in the development and health of all living things. The full value of plenty of natural light, sunshine, and fresh air is now appreciated by almost everybody. The paramount importance of using these elements to the fullest extent is amply illustrated in the application of science to architecture and the construction of

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our latest hospitals, schools, factories, buildings, and modern homes with the object of improving the general health and living conditions of the community.

Similar changes have certainly been demonstrated by those experienced in the poultry industry in the alterations which have taken place in the housing conditions over the past 30 years. These are probably just as important in the keeping of a flock of poultry in a healthy and productive condition as the selection for type, constitutional vigour, and the breeding for purity of blood.

Judging from the remarkable egg records put up by birds in our leading teams at the egg-laying contests, the appearance of the birds at the end of the laying season, and the general health one sees in the stock on most of our successful commercial poultry farms in the Dominion, it is definite that good housing plays an essential part in making for better egg production and the maintenance of the stamina of our flocks.

Comfortable Housing

The production of a good supply of winter eggs is artificial, as Nature never intended a hen to be capable of producing 230 eggs and more in a year. The housing conditions which have been adopted to assist in this production are responsible to a large extent for the results now achieved on the well-managed farms.

In horticulture the glasshouse has been introduced in order to produce early grapes and tomatoes, etc. This is an artificial method evolved to obtain these fruits out of season, and the same principle, although in a modified form, has been applied in the production of winter eggs by providing suitable and comfortable housing for the laying stock.

The object of providing suitable housing to poultry for the assistance of egg production is to endeavour to maintain the seasonable climatic changes as near as possible to that period which is most conducive to the productive season of the birds. To accomplish this it is essential that the conditions in the house should be kept reasonably steady and similar to those which resemble, more or less, the spring and summer months of the year.

Intensive System

On many of the large commercial farms—and even where small numbers of good laying birds are kept in city

The 3D. Egg is Here!

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POULTRYKEEPERS—with eggs fetching up to 3/- and more per dozen retail, every bird **MUST** be made to contribute its full quota to the egg basket. Otherwise, every egg you fail to get represents a serious loss. **CONSIDER THIS**—if you have ten birds averaging 3 eggs each per week, when they *COULD* be averaging 5, your weekly loss is approximately 5/-. On 50 birds you lose over 20/-. And bear in mind that your food bills cost you just the same.

Make sure, therefore, that your birds are laying every winter egg of which they are capable. HOW? By feeding them their natural stimulant (*ground insects*) in the shape of Karswood Poultry Spice. The cost is only two farthings per day for every 10 birds—3½d. per week. So that if your birds lay at least ONE extra egg per bird per week (which they should easily do)—with eggs at 3d. each this small investment comes back to you ***EIGHT TIMES OVER IN EXTRA PROFIT.*** Start Karswood this very week. Read this user's experience:—

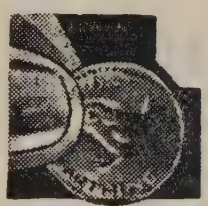
OVER 5 EGGS PER BIRD PER WEEK FROM 50 HENS.

"I have to thank you for the wonderful results I have obtained by using your Karswood Poultry Spice—especially as an egg-producer.

"All hens, both young and old, are looking most healthy and never in the months after the moult did I receive such a large number and uniform size of first-grade eggs. I keep 50 birds, heavy breeds, as surrounding my poultry houses is wet clay soil. By using Karswood Poultry Spice, I receive daily about 40 eggs, which I think is very good.

"I advise all poultrykeepers to use Karswood Poultry Spice for winter egg-producing and healthy stock."—G. G.

(Original letter on file for inspection)



¼D. A DAY FOR EVERY FIVE HENS IS ALL IT COSTS YOU

1/- packet of Karswood supplies 20 hens for 16 days; 2/- packet supplies 40 hens for 16 days; 7lb. tin (12/6) supplies 280 hens for 16 days. Test out a 2/- packet.

KARSWOOD POULTRY SPICE

Increases egg-production without forcing, because it contains ground insects, but no cayenne pepper, &c.

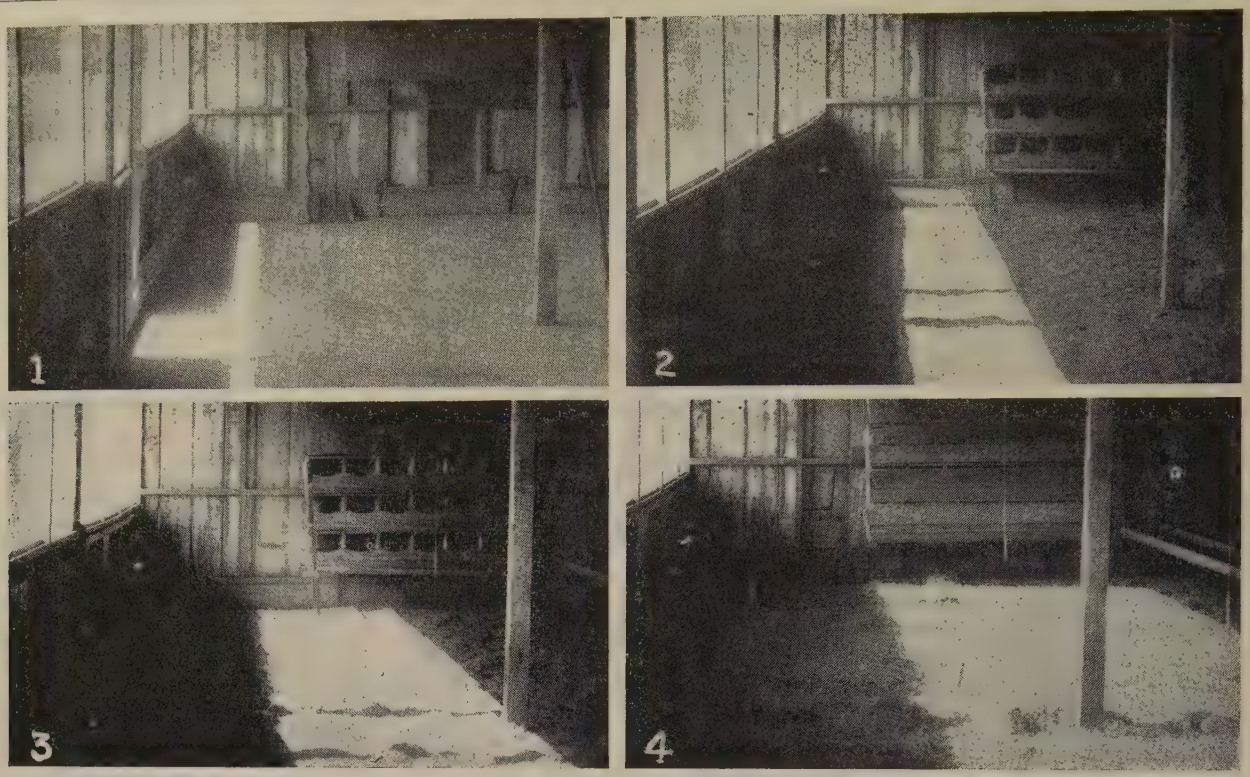


Fig. 1.—Noon, February 21; *Fig. 2.*—Noon, March 21; *Fig. 3.*—Noon, April 21; *Fig. 4.*—Noon, May 21.

sections—the intensive system of confining the laying stock to the fowl-houses during the whole of the year has given most satisfactory results, provided the birds have plenty of good, dry straw litter on the floors for scratching material.

However, where it is not desired to adopt this method, the semi-intensive system of housing under the same conditions during the winter period, when the ground outside the houses is often wet and cold, is far more desirable than allowing the birds out at all times, particularly where the runs or pens are of a limited area. This gives the ground outside the houses an opportunity to recoup and freshen up during a time when it is most likely to get cut up into a muddy state and become fowlsick.

Both these methods have largely contributed to overcoming some of the difficulties experienced in endeavouring to cope with sudden changes of climatic conditions.

Practical demonstrations have proved that the deep, open-fronted poultry houses are undoubtedly most suitable for the New Zealand climate. These must, however, be adequately ventilated to control and prevent the accumulation of dampness or the existence of any foul air. The floor should be well raised above the level of the surrounding ground, and thus ensure reasonable dryness of the litter or scratching material.

Making Use Of Sunlight

In making use of sunlight the accompanying photographs are most striking and demonstrate how a modern poultry house facing in a northerly direction will admit the maximum amount of sunshine through the open front during the shorter days of the year. This particular house faced due-north, and these photographs were all taken at noon on the 21st day of the

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various months. During November, December, and January, when the sun is more or less overhead at noon, and also when shade is more desirable than sunlight, the rays do not enter the house at all.

Fig. 1 shows the angle of the sun's rays at noon on February 21, showing a strip of sunshine covering several inches of the floor from one end of the house to the other. Fig. 2 shows how this strip of sunshine has increased in width by March 21, the autumn equinox, and the period of the year when very often the young pullets are just coming into production. Fig. 3 shows a further increase of sunlight entering the house at midday on April 21, and Fig 4 definitely shows that nearly half the floor is covered with sunshine on May 21.

Sun in Mid-winter

The sun sinks to a still lower altitude by June 21, that is, approximately the shortest day of the year, and naturally throws longer rays of sunlight and shadow. During this period we are generally experiencing the colder snaps of winter, and it will be realised that more than half the floor of one of these deep fowlhouses is covered with sunshine whenever the sun is shining. It will thus be seen that the modern poultry-house is more like a deep sun-porch than anything else, and for six months of the worst period of the year provides the laying stock with every comfort.

The physiological activity of a hen is most remarkable, and the environment described lends itself to a hen's daily work of scratching and obtaining the required exercise for the maintenance of perfect health and vigour, two most desired items for assistance in her production. If properly fed, good poultry kept under these conditions and protected from the rough elements of the weather and exposure to cold winds will always respond to the protection given, and profitable production will be the result.

It should also be emphasised that the sunlight is not only comforting to the birds, but acts as Nature's best agent for the destruction of all disease germs.

Seed Potato Certification

(*Continued from page 382*)

Name and Address	Group No.	Percentage of Foreign Varieties	Area in Acres
ARRAN PILOT.			
Commercial Seed (Canterbury).			
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	4	—	1
Robinson, R. G. Ltd., Box 4, Papanui (Line B) ..	4	—	1
IRON DUKE.			
Mother Seed (Canterbury).			
Croft, R., Amberley	5	—	2
Mother Seed (Otago).			
Grant, G. B., Puerua ..	4	—	1½
ARRAN CAIRN.			
Mother Seed (Canterbury).			
Robinson, R. G. Ltd., Box 4, Papanui	3	—	2
ARRAN CONSUL.			
Commercial Seed (Canterbury).			
Robinson, R. G. Ltd., Box 4, Papanui (Line A) ..	7	—	1
CATRIONA.			
Mother Seed (Canterbury).			
Kennard, J. R., Waituna, Waimate	4	0.6	1
EARLY REGENT BOLTER.			
Mother Seed (Canterbury).			
Penn, T. A., c/o R. G. Robinson Ltd., Box 4, Papanui	3	—	1
SIR J. G. WILSON.			
Commercial Seed (Canterbury).			
Robinson, R. G. Ltd., Box 4, Papanui	3	—	1

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

Wellington Y.F.C. Council Centennial Games

YOUNG Farmers from practically all districts of the Wellington province, Taranaki, Southern Hawke's Bay, Wairarapa, and Wanganui combined to hold one of the most successful evening sports meetings staged in Palmerston North for some time. This meeting, which was held on March 9, began at 7.30 p.m. on the Sportsground, and drew a large crowd of Y.F.C. members and their friends. All events were championships, and there was no lag in enthusiasm right through the programme, the final of the tug-of-war taking place shortly before 10.30 p.m.

The programme consisted of athletic sports, tug-of-war, and a short dance afterwards. The entries for the sports section were particularly good, close on 250 Y.F.C. members competing. The standard of competition was high, and some creditable times and distances were recorded. Many of the competitors were in steady training, as they are regular supporters of athletics in their respective districts.

The Championship Cup donated by the Wellington Council was awarded to Oroua Downs and Levin, who tied for first place with 13 points each. Marton was third with 11 points, and Dannevirke fourth with 9 points. The points were awarded on the basis of 5 for first place, 3 for second, and 1 for third place. The tug-of-war did not count in the championship. Certificates of merit were awarded to the individual winners of the various events, and also to the successful club teams in the relay and tug-of-war.

Tug-of-war

The feature of the evening was the tug-of-war tournament. This tournament, which was one of the largest ever staged in the Manawatu, drew 23 entries, and many exciting contests were witnessed. The tournament was staged on a raised platform in front of the grandstands, under the floodlights, and in full view of the crowd, which became increasingly enthusiastic as the tournament progressed. The clubs had been training their teams solidly for weeks in advance, and went down on the board in good fettle.

Great local interest was centred in each team, and judging from the barracking, each team had its full complement of supporters. The contests were pulled on cleats under the supervision of Mr. A. J. Galpin, who was the prime mover of the tournament. Each pull was of 1½ minutes' duration, except the semi-finals and finals, which were judged on the best of three pulls of one minute each.

Dannevirke brought a strong, well-trained team, but Apiti A proved just too good for them and won by half an inch right on time. This was in the quarter-finals, and was one of the best pulls of the evening. In the finals, Apiti A pulled Rangiwahia, and Apiti won the first two pulls. These two clubs are old rivals, and usually manage to meet each other in Y.F.C. contests, but it was generally recognised that Apiti thoroughly deserved their win.

Prizes Presented

The prize of £10 donated to the funds of the winning club and other prizes were then presented to the winners by Mr. J. Hodgens, M.P. for Palmerston North, who praised the work of the Y.F.C., and pointed out that it is the duty of every young man

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From Otakiri, Auckland.

Thank you very much for the Diploma which I received. The Course just completed will be of great value to me. Signed (————).

From Tatuanui, Thames, Auckland.

I feel confident that the Course I took will prove to be very useful to me, and am very grateful for the help and assistance given to me during my studies.—Signed (——).

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on the land who can possibly do so to join the organisation and do his bit in furthering the knowledge of farming and the well-being of the farming community.

At the conclusion of the tournament a short dance was held on the lawn, the music being supplied over the loudspeaker system. A hot supper was served throughout the evening. The weather was clear and calm and really ideal for the meeting, and it is hoped that at some future date the Y.F.C. members will be able to meet again and contest for the championship.

The following officials were responsible for the organisation of the sports under the direction of the tournament committee of the Manawatu Executive Y.F.C.:—

Manager, Mr. D. Rowlands; referee, Mr. Little; track marksman, Mr. H. deO. Chamberlain; field marksman, Mr. F. J. S. Holden; field judge, Mr. A. Hudson; assistants, Messrs. McDowell, Mitchell, L. R. Renouf, S. Rowlands, R. Rowlands, J. Spall; walking judge, Mr. N. Cruden; tug-o'-war judge, Mr. A. Hopwood; timekeeper, Mr. A. Guy; announcer, Mr. A. J. Galpin; clerk, Mr. W. Wilson; track judges, Messrs. F. E. Sherwood, W. E. Eton, and K. Parker; timekeepers, Messrs. C. Stagpoole, McHardie, and W. Howell; starter, Mr. J. Hebberley; scorer (track events), Mr. R. G. Scott; scorer (field events), Mr. C. S. Harris; marshal, Mr. McGregor Donald; announcer, Mr. J. V. Kyle; points recorder, Mr. W. Schwartz; chairman, Mr. H. M. Linklater; secretary, Mr. L. Earl.

Results

The following are the detailed results and points allocated:—

Abbreviations are used as follows to denote the various clubs:—Al., Alton; Ap., Apiti; Bal., Ballance; Bn., Bunnythorpe; Col., Colyton; D., Dannevirke; Kai., Kairanga; Km., Kimbolton; L., Levin; M., Marton; P., Pohangina; Rong., Rongotea; Wd., Woodville; Wai., Waituna; O.D., Oroua Downs; Bs., Bulls.

100 Yards Championship.—First heat: B. Kennedy (D.), 1; C. Eddie (Bal.), 2. Time, 12sec. Second heat: J. Cairns (Wd.), 1; K. Balmer (P.), 2. Time, 12 1-5sec. Third heat: C. Golder (Wd.), 1; D. Bailey (O.D.), 2. Time, 11 2-5sec. Fourth heat: A. Bush (M.), 1; D. Tennant (O.D.), 2. Time, 11sec. Fifth heat: R. Wing (M.), 1; H. Marshall (L.), 2. Time, 11 1-5sec. Sixth heat: K. Coles (M.), 1; H. Sloan (L.), 2. Time, 11sec. Seventh heat: E. M. Marshall (M.), 1; G. Garlick (Al.), 2. Time, 11 2-5sec. Eighth heat: Saggers (Al.), 1; G. H. Buchanan (D.), 2. Time, 11 2-5sec. Semi-finals: First heat: Bush, 1; Golder, 2; Kennedy, 3. Time, 11 1-5sec. Second heat: Coles, 1; Sloan, 2; Saggers, 3. Time, 10 4-5sec. Final: Sloan, 1; Saggers, 2; Bush, 3. Time, 10 4-5sec.

880 Yards Championship.—First heat: D. Bailey (O.D.), 1; O. Miller (Wd.), 2; T. Schroder (Bal.), 3. Time, 2min. 23 2-5sec. Second heat: C. Eddie (Bal.), 1; Lodge (Kim.), 2; L. Morris (Wai.), 3. Time, 2min. 19 1-5sec. Third heat: A. MacDonald (P.), 1; B. Garlick (Al.), 2; B. MacDonald (P.), 3. Time, 2min. 12sec. Final: A. MacDonald, 1; Lodge, 2; Morris, 3. Time, 2min. 13 1-5sec.

440 Yards Championship.—First heat: J. Howell (P.), 1; B. Garlick (Al.), 2; A. Gee (Bn.), 3. Time, 59 1-5sec. Second heat: K. Coles (M.), 1; C. Mullins (Bs.), 2; G. Garnett (Al.), 3. Time, 62sec. Final: Mullins, 1; Coles, 2; Howell, 3. Time, 57sec.

220 Yards Championship.—First heat: H. Sloan (L.), 1; C. Golder (Wd.), 2; K. Balmer (P.), 3. Time, 27 2-5sec. Second heat: Saggers (Al.), 1; A. Bush (M.), 2 ; K. Reisman (D.), 3. Time, 26 4-5sec. Third heat: J. Cocker (Rong.), 1; D. Kearney (Ap.), 2; I. Neill (P.), 3. Time, 25sec. Final: Sloan. 1; Cocker, 2; Saggers, 3. Time, 25 1-5sec.

Mile Walk.—N. Hearsey (O.D.), 1; R. Blackburn (L.), 2; H. Kempton (M.), 3. Time, 8min 51sec.

Inter-club Relay, 440 Yards.—First heat: Alton, 1. Time, 54sec. Second heat: Woodville, 1; Pohangina, 2. Time, 54 2-5sec. Third heat: Marton A, 1; Oroua Downs, 2. Time, 51sec. Final: Marton (R. Wing, A. Bush, K. Coles, A. Marshall), 1; Oroua Downs, 2; Alton, 3. Time, 52 2-5sec. Inter-district relay: Wanganui (R. Wing, A. Bush, K. Coles, A. Marshall), 1; Manawatu, 2; South Taranaki, 3.

Shot Put.—J. Harvey (D.), 27 ft. 5 in., 1; W. Brown (Kim.), 27 ft. 4½ in., 2; T. P. Blyth (D.), 25 ft. 9 in., 3.

High Jump.—V. Nix (Kai.), 5 ft. 2 in., 1; B. Kennedy (D.), 4 ft. 11 in, 2; A. Marshall (M.), 4 ft. 10 in., 3.

Long Jump.—C. Golder (Wd.), 19 ft. 5in, 1; C. Eddie (Bal.), 17 ft. 9 in., 2; B. Garlick (Al.), 17 ft. 6in, 3.

Tossing the Sheaf.—W. Dalgety (O.D.), 21 ft., 1; L. Thurston (Col.), 19 ft. 6 in, 2; M. Boswell (Rong.), 19 ft, 3.

Tug-o'-war.—First round: Apiti A beat Kairanga, Whakarongo beat Bunnythorpe B, Dannevirke beat Halcombe, Rongotea A beat Feilding, Bunnythorpe A beat Levin, Oroua Downs beat Norsewood, Apiti B beat Shannon. Second round: Pohangina beat Waituna A, Marton beat Bulls, Apiti A beat Colyton, Dannevirke beat Whakarongo, Bunnythorpe A beat Rongotea A, Apiti B beat Oroua Downs, Rangiwahia beat Rongotea B, Opiki beat Waituna B. Third round: Pohangina beat Marton, Apiti A beat Dannevirke, Bunnythorpe A beat Apiti B, Rangiwahia beat Opiki. Semi-finals: Apiti A beat Pohangina, Rangiwahia beat Bunnythorpe A. Final: Apiti beat Rangiwahia.

Championship Points.—Levin, 13 points; Oroua Downs, 13 points; tied for first place; Marton, 11 points; Dannevirke, 9 points; Kimbolton, 6 points; Pohangina, 6 points; Alton, 6 points; Kairanga, 5 points; Woodville, 5 points; Bulls, 5 points; Rongotea, 4 points; Colyton, 3 points; Ballance, 3 points; Waituna West, 1 point.

Cricket Match

A CLOSELY-CONTESTED cricket match was played on the Mental Hospital grounds, Te Awamutu, recently between the Te Awamutu and Kakepuku Young Farmers' Clubs.

The teams were as follows:—

TE AWAMUTU.

D. Hope	2
G. Underwood	6
O. Richmond	18
E. Lawry	34
C. Taylor	9
K. Fraser	1
E. Fraser	42
D. Harrison, not out	17
G. Donaldson	3
R. Patterson	0
A. Nicholas	2
Extras	0
Total	134

KAKEPUKU.

R. Smith	4
G. Law	14
E. Hopping	55
W. Neill	14
B. McVerry	2
R. Chestnut	11
M. Neill	3
H. Hopping	1
T. Ray, not out	0
P. Ray	0
R. Hill	0
Extras	9
Total	113

Te Awamutu won by 21 runs. Kakepuku Club served lunch.

The attention of our readers is drawn to an advertisement appearing in this issue announcing the organisation which has been arranged by the Centennial Branch of the Department of Internal Affairs in collaboration with the British Drama League and Auckland Drama Council to give effect to the decision of the Government to include in its programme of National Centennial Celegrations a festival of community drama. The festival will take the form of a competition in which play-acting groups in all parts of the Dominion should be interested.

Wairarapa District Activities

A DISTINCT revival of interest was evidenced this year in the special Y.F.C. classes scheduled at the Masterton A. and P. Show. The programme was arranged to avoid clashing with other show activities with which Young Farmers were concerned, and consequently good entries were obtained.

In the Southdown judging class (judged by Mr. R. M. Perry) the prize-winners were:—A. P. Southey, 1; J. S. Mackay, 2; E. Ellis, 3. Two fat lamb classes (judged by Mr. F. G. Stowell) were included—one for a pen entry, which was won by K. McGillivray, with D. McGregor second, and the other for judging pens of lambs, which resulted as follows:—A. Crickshank, 1; G. Blatchford, 2; J. West, 3.

No Wairarapa function is complete unless the Y.F.C. members are represented, and the Masterton Centennial procession was no exception. Attired in a variety of old-fashioned clothes, and with suitable facial adornments, members of the Masterton Club provided an interesting equestrian group at Solway Showgrounds recently.

The Wairarapa Clubs have good reason to feel proud of their achievements in stock judging contests. These contests have always been made a strong feature of club and district activities, and the training received by members has without doubt contributed to their success in the National Stock Judging Competitions. It is, therefore, gratifying to find that the first names to be engraved on the Federation's Challenge Cup for teams championship are those of the Wairarapa team—Messrs. G. Blatchford, I. McLaren, and H. McKenzie.

The National Stock Judging Cup.

Toko Club's Sports Meeting

THERE was a good attendance at the Toko Y.F.C. annual sports meeting, and all events were well contested. The prizes were presented by the advisory president, Mr. G. Were, at a euchre tournament and dance held in the evening at the Toko Hall. Mr. Were congratulated the young farmers on the organisation of their club and its activities generally.

Prize-winners of the main events were:—

100yds., under 17.—R. Smith, 1; P. Worthington, 2; T. Rowe, 3.

Half-mile Cycle (boys).—K. Swindlehurst, 1; T. London, 2.

100yds. Open.—C. Martin, 1; P. Jones, 2; T. Rowe, 3.

75yds. Women.—R. Martin, 1; O. Hansen, 2; A. Lister, 3.

Schoolboys' Obstacle.—S. Lawrence, 1; K. Swindlehurst, 2; J. Needham, 3.

Married Men's Race.—J. Martin, 1; H. Hansen, 2; J. Walter, 3.

Cigarette Race.—W. Lister and R. Martin, 1; C. Martin and O. Hansen, 2; H. Hansen and A. Lester, 3.

22yds. Open.—P. Worthington, 1; C. Martin, 2; J. Murphy, 3.

Married Women's Race.—Mrs. Houghton, 1; Mrs. Bland, 2; Mrs. Kilsby, 3.

Obstacle Race.—R. Smith, 1; P .Worthington, 2; J. Murphy, 3.

Half-mile Cycle Race.—P. Jones, 1; D. Ancell, 2; G. Anderson, 3.

One Mile Cycle Race.—S. London, 1; D. Ancell, 2; C. Carley, 3.

One and a half miles Cycle Race.—D. Ancell, 1; W. Harris, 2.

Other prize-winners were:—Sheaf tossing, G. Harris, jun.; sheep guessing, T. Needham; chain stepping, Mrs. G. Were and G. Harris, jun.; nail driving, Mrs. G. Harris, W. Donaldson; best loser, J. Murphy.

Winners of euchre were:—Mrs. H. Bayley and Mr. D. Larkin, Mrs. L. Milne and Mr. G. Were (consolation). Afternoon tea and supper were handled by the Women's Division of the Farmers' Union.

Alton Club's Sports, Ball, and Stock Competitions

G. GARRETT, Hon. Sec., Alton Club, South Taranaki.

WITH perfect weather and an excellent attendance, everything was in the club's favour on March 14, the day planned for the annual picnic and sports. Beginning at 11 a.m., a programme of eight running, three cycling, and nine field events kept the members busy all day. In addition to the above programme, there was chain stepping, weight guessing, clock golf, nail driving, tilting the ring in cars, and "taipo" for the older people.

For the running events the club have four cups for annual competition, three of which were won by B. Garlick, a club member, and the other by E. Jamieson. In all the other events the winners and second to finish qualify for a good trophy. During the afternoon races for the children were also held, the sum of £1 of the club's funds being divided for prizes.

The jumping was of the usual high standard, and some of the other field events caused much amusement among the crowd, especially the cigarette race and pillow fighting. The most popular and exciting race was the open mile, which resulted in a win for V. Armstrong by a very narrow margin.

The dinner and afternoon tea were served by members of the local Women's Division of the Farmers' Union.

The Alton Hall was filled to capacity in the evening when dancers from all parts of South Taranaki gathered together for the club's ball. The hall was artistically decorated for the occasion by the members in the club's colours, blue and gold.

During the evening Mr. S. J. Leigh, club chairman, thanked all who had co-operated to make the day such a success. In the absence of Mr. J. E. Davies, district secretary, the club president, Mr. W. A. Taylor, presented the cups and trophies won during the day.

Supper was served by members of the committee.

The profits of more than £8 for the whole day were divided in half and donated to the local Red Cross and the club's special "War Effort Fund." This fund is built up by voluntary weekly contributions from members to tender farewells to members who join the New Zealand Forces for overseas service, and for general patriotic purposes.

Stock competitions were held on March 23. There was a large gathering of interested people, and ideal weather prevailed.

Three local farmers have donated handsome cups for annual competition for the following classes:—Best calf, best yearling, and best two-year-old heifer in milk.

The calf cup has been competed for on four occasions, and this year's winner was A. Garnett. This class attracted nine entries. The other two cups were competed for for the first time this year, the winners being F. Garnett and E. W. Garnett respectively. These contests also attracted splendid entries.

The judge, Mr. S. G. Morgan, congratulated the exhibitors on the manner in which their stock was shown, and the club for its keenness in these activities. Mr. Morgan then demonstrated on two bulls brought for the purpose, and gave a talk on subjects relative to showing and breeding.

Mr. W. A. Taylor thanked the judge for his work, and presented the cups. Afternoon tea was provided and served by local ladies, who were thanked by Mr. S. J. Leigh, the chairman.

Young Farmers' Club Course

A short course has been arranged for Young Farmers' Club members at Whangarei for the week commencing June 24. This course will comprise a series of lectures over two days with a short tour to the North Auckland district over the remaining period of the week. The cost of the course will probably be in the vicinity of £2 10s. Full particulars may be obtained from the Instructor in Agriculture, Department of Agriculture, Whangarei.

Among the Clubs: Reports on Activities

Western Southland.

Dipton.—General business. Discussion held on Centennial Tree Planting Scheme. A lecture entitled "Notes on Stock Diseases" was given by Mr. W. Peerson, Gore.

Lochiel.—Annual meeting. Officers elected: Advisory president, Mr. J. Robb; club chairman, A. S. Irwin; secretary, S. W. Gray; treasurer, J. Dooley, jun.

Thornbury.—Annual meeting. Officers elected: Advisory president, Mr. J. Linscott; club chairman, K. E. McKenzie; secretary, M. L. Leith; treasurer, J. Fallow. At previous unreported meetings Mr. Aberdeen, of the Riverton and District Veterinary Club, spoke on "The Post-mortem Examination of Animals" and demonstrated his lecture with the carcass of a deceased lamb. Mr. W. R. Harris, Invercargill, gave an address on "Topdressing," which he illustrated with lantern slides.

Wyndham.—Annual meeting. Officers elected: Advisory president, Mr. E. Rabbidge; club captain, F. Clay; secretary-treasurer, A. Howe; vice-chairman, J. H. McLaren.

Eastern Southland.

Balfour.—General business.

Crookston.—Annual meeting. Officers elected: Advisory president, Mr. A. Pullar; chairman, J. Sim; secretary, J. Evans, jun.

Otama.—A lecture entitled "The Necessity of Maintaining the Humus Content of the Soil" was given by Mr. S. D. Blomfield.

South Otago.

Clinton.—Annual Meeting. Officers elected: Advisory president, Mr. J. Mearney; chairman, C. Turnbull; secretary, J. C. Mitchell.

Lawrence.—Arrangements for debate with Milton Club. The Centennial Tree Planting Scheme discussed.

Milton.—Debating team selected for inter-club contest with Lawrence Young Farmers. Two members gave a talk on their visit to the Centennial Exhibition.

Warepa.—Annual meeting. Election of officers. Programme for 1940 was discussed, and the Centennial Tree Planting Scheme was considered in detail.

Central Otago.

Arrowtown.—Annual meeting. Officers elected: Advisory president, Mr. W. S. Reid; chairman, R. Scott; secretary, A. L. Reid.

Roxburgh.—Annual meeting. Officers elected: Advisory president, Mr. R. T. Kinaston; chairman, J. Martin; secretary, L. A. Henderson.

Dunedin.

Palmerston South.—General business. Mr. S. H. Saxby, Department of Agriculture, exhibited several films of agricultural interest, namely, "Production of Quality Milk," "Testing Seeds in Soils." "Seed Dispersal," and "Haymaking in America."

South Taieri.—Annual meeting. Officers elected: Advisory president, Mr. R. G. Stiell: chairman, J. Richards; secretary, W. McLaren.

West Taieri.—General business. Mr. S. R. Whyte, secretary of Otago-Southland Y.F.C. Council, explained in detail the Centennial Tree Planting Scheme. Mr. S. H. Saxby, Department of Agriculture, gave a motion picture display, the films exhibited being of general farming interest.

South Canterbury.

Albury.—Annual meeting. Officers elected: Advisory president, Mr. A. Smith; secretary-treasurer, T. Irving.

Arno.—Annual meeting. Officers elected: Advisory president, F. Dugdale; chairman, C. R. Lindsay; secretary, R. Corbitt.

Geraldine.—Annual meeting. Officers elected: Advisory president, Mr. M. Brenton; vice-president, Mr. D. Muff; secretary, J. A. Thatcher; treasurer, V. Stonyer. Decision by members to take a Wool Classing Course. Arrangements for club dance.

Milford.—Annual meeting. Officers elected: Advisory presidents, Messrs. A. Johnston and A. D. Crossman; chairman, L. Lindsey; secretary, G. D. Crossman; treasurer, W. McCormick; senior vice-president, J. Woodhead. A special meeting was held recently to welcome Mr. A. H. Chappell, one of the Western Australian Young Farmers visiting the Dominion. Mr. Chappell gave a short talk on "Farming in Western Australia."

Mid-Canterbury.

Ashburton.—Annual meeting. Election of officers for the new year.

Hinds.—As a Centennial Memorial it was decided to plant trees both in the Domain and along a road side.

Mayfield.—Public speaking contest for "Barford Cup." The judge, Mr. W. Crawford, Ashburton Technical High School, congratulated the speakers, and gave constructive criticisms on the individual efforts. The result of the competition was:—W. F. Mulligan, 1; W. L. Doyle, 2; W. Greenslade, 3. The advisory president presented the cup to the winner, and the evening concluded with supper.

Methven.—Annual meeting. Officers elected: Advisory president, Mr. R. J. Low; chairman, R. Penny; deputy-chairman, D. McLaughlin; secretary, H. J. Puff; treasurer, R. Wightman, jun.

Christchurch.

Darfield.—Annual meeting. Officers elected: Advisory president, Mr. C. C. Redfern; chairman, B. E. Jarman; secretary, R. M. Fechney; assistant secretary, L. McLaughlin. At a more recent meeting a lantern lecture entitled "Farm Management" was given by Mr. W. W. Mulholland.

Ellesmere.—Annual meeting. Officers elected: Advisory president, Mr. G. R. W. Osborne; chairman, K. I. McGill; secretary, D. Hurford; treasurer, G. McLaughlin.

Springston.—Annual meeting. Officers elected: Advisory president, Mr. P. V. Bailey; chairman, C. Tyson; secretary, E. C. Opie; treasurer, C. Bailey.

North Canterbury.

Amberley.—Annual meeting. Officers elected: Advisory president, J. Farquhar; vice-presidents, Messrs. A. Ashworth and W. Briggs; chairman, L. Briggs; secretary, P. Coleman; treasurer, C. Ashworth; reporter, R. Hislop.

Amuri.—Annual meeting. Officers elected: Advisory president, Mr. A. C. R. Robinson; chairman, H. D. Bowron; secretary, W. P. Belton; treasurer, T. Harland, jun.

Cheviot.—Annual meeting. Election of officers for next 12 months. Arrangements for annual club ball.

Cust.—Annual meeting. Officers elected: Advisory presidents, Messrs. E. A. Woodfield (senior), F. Sheat, and Spencer Brown; chairman, A. McIntosh; secretary, L. Blackmore; treasurer, I. Graham; reporter, B. McIntosh.

Marlborough.

Blenheim.—Meeting decided to order 600 pinus insiges trees under the tree planting scheme. Arrangements for club picnic in the Sounds. At ap revious meeting the members held an informal discussion on "The Advantages of the Header Machine over the Thresher."

Flaxbourne.—Annual meeting. Election of officers for 1940. Lecture by Mr. W. Morrin on "The Breeding of Sheep for the Works."

Wairarapa:

Carterton.—Two teams to be entered in the "Point Blank" Stock Judging Competitions to be held at Solway. Arrangements for two club debates. Prize to be awarded to member proposing the greatest number of new members during the coming year. Mr. D. L. Taverner spoke on "Farm Accountancy."

Greytown.—Annual meeting. Election of officers for new year. The Borough Council to be asked to co-operate with the club in the tree planting scheme. Stock judging team chosen; also the club debating team was selected.

Martinborough.—General business. An address on "Breaking in Rough Country" was given by Mr. W. Busch.

Masterton.—General business. Mr. N. Lamont, Department of Agriculture, gave an instructive lantern lecture on "Rotational Grazing."

Manawatu.

Apiti.—Annual meeting. Officers elected:—Advisory president, Mr. H. C. McIntyre; chairman, Mr. L. McIntyre; secretary-treasurer, E. S. Payton.

Bunnythorpe.—Annual meeting. Officers elected:—Advisory president, Mr. J. Linklater; chairman, G. Wiggins; secretary-treasurer, MacGregor Donald. At a subsequent meeting final arrangements were made for a tug-of-war contest to be held in conjunction with the local Patriotic Society's effort to raise funds for the overseas forces. A lecture on "Lucerne" was given by Mr. A. J. Galpin, an advisory member.

Colyton.—Annual meeting. Officers elected:—Advisory president, Mr. W. Hocken; chairman, R. Tunston; secretary-treasurer, A. Burr. At a subsequent meeting Mr. J. Jamieson, Feilding, spoke on "Grasses and Their Place in Pastures."

Feilding.—Annual meeting. Officers elected: Advisory president, Mr. H. Brewster; chairman, R. W. Durrant; secretary, I. D. Colquhoun. Team of four selected to represent the club at Marton Stock Judging Competitions. Decided to hold an open meeting in the near future. Three new members elected. General discussion on topical subjects followed.

Halcombe.—Tug-of-war team chosen. Finalising arrangements for tree planting scheme. A very interesting lecture by Mr. Bruce McLeod, his subject being "Farm Forestry."

Johnsonville.—General business. Captain Vicherman, of the New Zealand Military Forces, gave a short address in connection with an appeal for recruits for the Territorials.

Kairanga.—Annual meeting. Officers elected:—Advisory president, Mr. P. Nielsen; chairman, S. Richardson; secretary-treasurer, A. Nielsen. Discussion on proposed field day, South Island tour, and tug-of-war at Bunnythorpe. Mr. Bailey spoke on "Troubles in the Milking Herd, Their Causes and Cures."

Kimbolton-Kiwitea.—Tree planting scheme discussed. Sports teams selected. General discussion among members present on various subjects, including "Does the Late Lamb Pay?" "Does It Pay to Strip Cows?" and "Bearing Troubles in Ewes."

Levin.—Annual meeting. Officers elected:—Advisory president, Mr. H. J. Lancaster; chairman, V. C. Lewis; secretary, B. D. Stewart; treasurer, P. Carter. Six new members were elected. A discussion on the future of the club took place.

Opiki.—Forthcoming Y.F.C. tour discussed. Arrangements for Jersey Club's field day. Further lecture by Major B. A. Norman entitled "Life in the Army."

Oroua Downs.—Field day to be held. Arrangements for club dance left to committee. Mr. E. P. Neilson addressed the meeting on "Improvement of Dairy Herds."

Otaki-Te Horo.—Annual Meeting. Officers elected:—Advisory president, Mr. C. C. Holmes; chairman, M. C. Holmes; secretary-treasurer, W. Broadbelt. Arrangements for club dance.

Pohangina Valley.—Annual meeting. Officers elected:—Advisory president, Mr. H. M. Linklater; chairman, T. A. Turnbull; secretary, I. B. Clapham; treasurer, V. Sinclair. At a subsequent meeting Mr. M. Arbon spoke on "Home Movies."

Rangiotu.—Annual meeting. Officers elected:—Advisory president, Mr. R. M. White; chairman, S. H. Lucas; secretary-treasurer, W. R. Bond. At a subsequent meeting Mr. L. Earl, Department of Agriculture, exhibited films of agricultural interest, namely, "Modern Methods of Haymaking" and "The Growth of Animals in Various Stages."

Rangiwahia.—Annual meeting. Officers elected:—Advisory president, Mr. E. G. Billinghurst; chairman, A. G. Hancock; secretary-treasurer, R. C. Hancock.

Rongotea.—Annual meeting. Officers elected:—Advisory president, Mr. H. J. Lancaster; chairman, J. H. Gibbons; secretary, G. Pearson. Arrangements for club dance and visit to Centennial Exhibition. Three new members elected. Stock judging team selected. Mr. L. Earl, Department of Agriculture, outlined the proposed South Island tour.

Shannon.—General business. South Island tour discussed. The chairman and secretary to meet the directors of the Dairy Company at their next meeting re tree planting. An interesting talk was delivered by Mr. L. Earl, Department of Agriculture, on "A Comparison of the Working Costs of Tractors and Horses."

Tokomaru.—Annual meeting. Officers elected:—Advisory president, Mr. J. H. P. Liggins; chairman, A. J. Moody; secretary-treasurer, K. R. Whyte.

Watuna.—General business. A talk entitled "The Difference Between Farming in Canterbury and the Manawatu" was given by Mr. L. Earl, Department of Agriculture. This address was followed with keen interest and proved very instructive.

Whakarongo.—Annual meeting. Officers elected:—Advisory president, Mr. R. G. Scott; chairman, B. Dickson; secretary, I. Tabor; treasurer, E. Morris. Decided to send tug-of-war team to Bunnythorpe. "Parents and Friends" evening held. A film display was presented by Mr. S. Freeman, Dominion Organising Secretary, and the evening concluded with several musical items.

Wanganui.

Marton.—Arrangements re national tree planting. Final preparations made for dinner and annual dance.

South Taranaki.

Alton.—Arrangements for annual sports and ball. Mr. C. P. Palmer, a club member, entertained the meeting with a motion picture of Rotorua.

Kaponga.—Annual meeting. Election of officers. The club will probably support the tree planting scheme.

North Taranaki.

Cardiff.—Club to donate £1 1s to Patriotic Fund. Decided to approach Hall Committee relative to obtaining permission to plant trees in area adjacent to hall. A prepared speech competition was held, the winner being J. Sharland.

Hillsborough.—Annual meeting. Officers elected:—Advisory president, Mr. A. Kain; chairman, N. T. Sampson; secretary, G. R. Meharry; treasurer, E. Andersen. At a subsequent meeting a club debate was held, the subject being, "Herd-testing is a Progressive Step in Farming." The teams were:—Affirmative, N. Simpson, P. Locke, N. Warren, E. P. Gray; negative, G. R. Meharry, D. Arbuckle, E. Andersen, B. Sinclair. The affirmative side were declared the winners.

Inglewood.—General business. Mr. Buckley gave a very interesting account of his recent tour of England and Europe.

Mangamahoe.—Annual meeting. Election of officers. Discussion on land settlement scheme.

Mangorei.—Annual meeting. Election of officers. Mr. G. A. Blake, Department of Agriculture, gave a talk on "Topdressing." At a previous meeting a debate was held, the subject being "Mixed v. Dairy Farming."

Okau-Tongaporutu.—Annual meeting. Officers elected:—Advisory president, Mr. R. Gibbs; chairman, K. Calvert; secretary, M. Collins; treasurer, J. O'Sullivan. Arrangements made for annual dance.

Rahotu.—Annual meeting. Officers elected:—Advisory president, Mr. W. J. Wright; chairman, R. G. Dawson; secretary, L. H. Butler; treasurer, J. W. Waswo.

Tikorangi.—Annual meeting.. Officers elected:—Advisory president, Mr. C. Foreman; chairman, G. Jupp; secretary, V. Sarton; treasurer, L. Jury.

Toko.—General business. An address was given by Mr. G. A. Blake, Department of Agriculture, on "Topdressing."

Midhirst.—Annual meeting. Officers elected:—Advisory president, Mr. J. W. E. Schumacher; chairman, J. S. Harper; secretary-treasurer, J. L. Hunt. Field day held by Stratford Jersey Club on Mr. John's property, Ngaere. Mr. Sorrenson, New Plymouth, demonstrated on pigs, and Mr. Dale, Hamilton, gave a demonstration of judging a Jersey cow, after which competitions were held. J. Bell, a club member, won two cups, one for the open class and one for the District Clubs' Judging.

Southern Hawke's Bay.

Ballance.—Arrangements for Centennial ball and club debate. A most instructive address was given by Dr. E. B. Watson on "First Aid on the Farm." Dr. Watson dealt particularly with common accidents likely to occur on farms.

Mangatainoka.—Annual meeting. Election of officers. Centennial Tree Planting Scheme discussed. Arrangements for annual dance.

Woodville.—Suggestions received for suitable plots to plant trees as a Centennial Memorial. A discussion took place on "In What Direction the Country Can Best Increase Production." The speakers were K. Mitchell, A. Curry, and A. Compton.

Central Hawke's Bay.

Hastings.—Annual meeting. Officers elected: Advisory president, Mr. S. A. Bainbridge; chairman, T. Tomoana; secretary, K. C. Campbell.

Takapau.—Annual meeting. Election of officers. Discussion of proposed club dance. Finalising arrangements for Centennial Tree Planting Scheme.

Waipukurau.—Field day held at Arlington Station. There was an attendance of 280, of whom 250 were members of the general public. The opening speeches were made by Mr. A. P. O'Shea, Dominion Secretary, N.Z.F.U. The demonstrations and lectures included "Mole Drainage" (Mr. J. W. Palmer, Department of Agriculture); "Petroleum—Its Relation to Agricultural and Pastoral Industries" (Mr. Lister); "Post Mortem on Sheep With a View to Sudying Internal Parasites" (Mr. Laing, Department of Agriculture); "Our Pastures and Their Relation to Our War Effort" (Mr. E. B. Levy, Department of Scientific and Industrial Research).

Northern Hawke's Bay.

Matapiro.—Field day held on Mr. E. H. Beamish's property. Opening speeches were made by Mr. Beamish, and he later demonstrated the outstanding fatures of his flock Romney rams and also his stud Romneys. This was followed by a lecture entitled "Points of a Horse," by Mr. A. W. Whyte. Members were then shown over Mr. Beamish's wool-shed, which was built in 1899, and is still as sound as ever. Messrs. Magill and H. Pearce thanked Mr. and Mrs. Beamish for the day and the afternoon tea provided.

Meeanee.—A report was read on the club's part in the recent Napier Centennial Celebrations, in which the members had entered a float consisting of a fine team of greys drawing an old-time wagon. Several new members were elected. At a previous meeting a subscription was opened for the purpose of making presentations to club members proceeding on active service. A donation of £1 1s was made to the Patriotic Fund.

Wairoa.—Team of five members selected to represent the club at the Hawke's Bay Centennial Radio. Mr. E. E. C. Boyes spoke on "Britain at War."

Poverty Bay.

Gisborne.—Two short talks by club members. R. Field spoke on the recent wool appraisements, describing the various stages through which the wool passed from the time it left the grower until it left the store for shipment. O. Phillips, gave a resume of his recent extensive tour of the South Island. A talk on "Elocution" was given by Mr. F. R. Ball.

Tolaga Bay.—General business. A talk entitled "Surveying" was given by Mr. Percy. At a previous meeting Mr. N. B. Smith spoke on "Transport."

Te Kuiti.

Te Anga Central.—Annual meeting. Officers elected: Chairman, M. J. Miln; secretary, O. H. Gordon; treasurer, R. A. Soundy. Arrangements for stock judging competition and a field day.

Eastern Bay of Plenty.

Edgecumbe.—Arrangements for dance to raise funds for the District Committee. A general discussion among members on "Farming and Fighting."

Opotiki.—Annual meeting. Officers elected: Advisory president, Mr. D. G. Beattie; chairman, B. F. Gilmore; secretary, S. J. Cooper.

Waimana.—Annual meeting. Election of officers. General discussion on future of club.

Western Bay of Plenty.

Katikati.—Annual meeting. Officers elected: Advisory president, Mr. W. Capamagian; chairman, G. T. Walford; treasurer, D. B. Thomas; secretary, D. M. Clague. Proposed visit to Centennial Exhibition discussed. Mr. S. Sargent spoke on the field day held recently at Tauranga.

Pukehina.—Annual meeting. Election of officers. Two dozen trees to be ordered under the tree planting scheme. Each member to pay 1ls per month towards Patriotic or Red Cross Funds. Club debate to be held.

Te Puke.—Annual meeting. Officers elected: Advisory president. Mr. D. S. Ross; chairman, J. Nicholl; secretary, B. Caldwell; treasurer, P. Nichol.

Waihi.—Annual meeting. Officers elected: Advisory president, Mr. H. Chester; secretary-treasurer, B. Snow.

Waikato.

Cambridge.—Annual meeting. Officers elected: Advisory presidents, Messrs. A. Gascoigne, J. Archer, and R. D. Fisher; chairman, T. Bremer; secretary, E. Anderson; treasurer, R. Giles.

Hauraki.—Annual meeting. Officers elected for 1940.

Kakepuku.—Annual meeting. Officers elected: Advisory president, Mr. S. H. West; chairman, B. Boswell; secretary, W. G. Neill, jun; treasurer, D. A. McLeay.

Tauhei.—Annual meeting. Officers elected. Centennial Tree Planting Scheme discussed. A short talk on "Pigs" was given by Mr. I. Harris.

Te Awamutu.—Annual meeting. Officers elected: Advisory president, Mr. A. S. Wyllie; chairman, M. Lorimer; secretary, E. D. Fraser; treasurer, I. Donaldson. At a previously unreported meeting a club debate was held, the subject being "That the Young Farmer of Today Has Better Opportunities Than Had His Grandfather in His Youth." The affirmative was taken by J. Flinn, E. Lawry, A. McDonald, and I. Martin. The negative side consisted of D. Harrison, K. Fraser, C. Nicholas, and J. Garret. The affirmative team was declared the winner by a margin of four points. Mr. A. H. Ward gave a short talk on "Facts, Fallacies, and Modern Methods of Breeding." Other speakers were Mr. S. Rhodes ("Sheep Breeding") and Mr. J. Patterson ("Preparation of Dairy Cattle and Pigs for Show Classes"). Field day held at Horotiu Freezing Works and Frankton Box Company.

Auckland.

Clevedon.—Field day to be held. O. Smith and G. Bell placed first and second respectively at the Auckland District Bacon Competition. Mr. W. Alexander, of Messrs. Kempthorne Prosser and Company, gave an address on "Draining," and Mr. Alexander, jun., spoke on Nauru Island. Both talks were illustrated with the aid of lantern slides.

Franklin.—Annual meeting. Officers elected: Advisory president, Mr. F. Appleby; chairman, A. Franke; secretary-treasurer, R. W. Franke. An interesting talk was given by Mr. H. Woodyear Smith on "Australia."

Mauku.—General business. Mr. W. Smith showed a film on "Australia" and gave a lecture entitled "Autumn Topdressing." At a previous meeting Mr. Dewhurst spoke on "Bacon Pigs" and exhibited a film on "Timber."

Warkworth.

Kaukapakapa.—Arrangements for manurial trials. Decided to support the Centennial Tree Planting Scheme. Election of officers for 1940 and general business.

Whangarei.

Kerikeri.—General business. Mr. A. Knowles, advisory president, addressed the meeting on "Chemical Factors in the Orchard."

Matarau.—Annual meeting. Officers elected: Advisory president, Mr. H. H. Wilsher; chairman, W. A. Ruchbrook; secretary, T. L. McKegg; treasurer, T. Brown.

Maungatapere.—General business. Mr. H. M. Peirson, Department of Agriculture, gave a lecture on "Pigs and Their Diseases." This talk was illustrated with a film. At a previous meeting Messrs. Ross, C. Walker (Department of Agriculture), S. Freeman (organising secretary), and J. M. Smith (Department of Agriculture) gave short addresses on the "Y.F.C. Movement." The evening concluded with a film on "Australia," presented by Mr. H. Woodyear Smith.

Dargaville.

Arapohue.—Annual meeting. Officers elected: Advisory president, M. Montgomery; chairman, J. T. Studholme; secretary, N. A. Vallance; treasurer, B. Cleang.

Marahemo.—Field day held at D. Fergus Estate. There was an attendance of 30, of whom 15 were members of the general public. Mr. E. H. Arnold (Department of Agriculture) made the opening speeches, and the demonstrations and lectures included the following:—"Identification of the Various Types of Grasses in the Plots" (E. H. Arnold), "How to Kill and Skin a Sheep" (Mr. H. Bradley).

Kaitaia.—Annual meeting. Officers elected: Advisory president, Mr. E. W. Hanson; chairman, T. W. Flinn; secretary, J. Cowie; treasurer, V. C. Flinn.

Health Notes for the Farm

Contributed by the Department of Health

Fleas

A Visit From These Pests Can Be Prevented

IN the second book of Moses it is recorded that God sent a plague of insects upon Pharaoh and his people. Since that time Mankind has continued to suffer to a degree in keeping with the opportunities afforded for insect breeding, and in some tropical countries it has even been a problem whether man could survive or be displaced by the myriads of insect life.

It is interesting to note that we have what might aptly be termed "indoor" and "outdoor" insects, each constituting an entirely separate set. The typical "household" type of insect rarely bothers livestock or crops, and, except in a few cases, prefers the protection and nourishment to be had in our homes rather than to suffer the rigours of the out-of-doors. While the span of life of some of the purely household insects is of brief duration, there is the never-ending battle in prospect for the householders or institutions who would maintain their premises free from these disgusting and ofttimes dangerous vermin.

A flea or a bed bug sampling delicate and sensitive parts of one's anatomy (for some of these insects appear to have the instinct of an epicure), and despoiling delicacies prepared for exacting husbands, ardent admirers, or select afternoon teas, and moths destroying fur coats, pretty frocks, and treasured, ancient suits, are possibilities not pleasant to dwell upon. The subject of the destruction of these pests is therefore of considerable importance in the interest of domestic peace and harmony and well-being. In this article we will confine our remarks to the flea.

Varieties of Fleas

There are some 500 varieties of fleas known, the most important from a public health point of view being the human flea and the various rat fleas. With the human flea we all have (probably quite inadvertently) made more than a passing acquaintance. The form and appearance of a flea need no description here. The only anatomical fact requiring mention is that the legs are so modified that the insect is capable of executing quite remarkable jumps which, when contrasted in length with the parasite's size, might well excite the envy of any "hurdler." The reader has probably been a witness to the remarkable athletic achievement of this annoying insect when he has been bent on its destruction.

The white eggs are usually laid singly. The female lays about a dozen eggs at a time. In from two to ten days they hatch out into little grub-like larvae. After the larval stage it spins itself a cocoon, from which the adult emerges. Eggs are not usually laid on the host of the adult parasite, but are found in cracks in the floor and in crevices in the wall, or in the bedding, carpet, cushions, etc.

Flea larvae are very active, and can move about with considerable rapidity. Their food consists of various organic refuse that lies about in these places where they are hatched. The adult, when it first emerges from the cocoon, is fat and can live for some time without food. Ultimately they find their natural hosts in the case of the human and rat fleas, and remain fairly constantly attached to the one host. They usually shun daylight, and are attracted by warmth. The food, of course, is the blood of their victims.

The effects of a flea bite vary greatly in different persons, and usually there is more or less irritation and itching. This is due to the salivary secretion of the parasite. The mark is usually hard, red, and irritating. Generally the effect wears off in a few hours. The flea may, under favourable circumstances, live for a period of eighteen months. The total number of eggs laid by the adult female may reach a total of 450.

Carrier of Plague

The most important flea from the point of view of the public health is the rat flea. This flea is the carrier of plague. The special bacillus of plague is sucked by the flea from the blood of an infected rat, and is thus spread to other rats in the process of feeding. Plague-infested fleas may also bite human beings and so give rise to a case of human plague. Therefore, in the process of cleansing rats from shops, buildings, etc., when there is any suspicion of plague, extreme precautions must be taken by the operators in order to prevent being bitten by fleas.

Victor Heiser, in his book "A Doctor's Odyssey," states that one day the editor of the "Manila Daily Bulletin" was taken violently ill, and 48 hours later died. While the sanitary squad was carrying out the insecticidal and

other ante-plague measures in his office an inspector pulled the upper drawn of his desk out to the end. Live fleas were seen hopping around, and in the very back lay the body of a mummified rat. A hole in the rear of the drawer showed the manner of its entrance. After the rat had died its fleas had deserted it. The editor was presumably working in his shirt sleeves because of the heat, and must have reached into the drawer and been bitten by one of these fleas.

Rats on Ships

From 1901 to 1911, 20 cases of plague were reported in New Zealand, but since 1911 no further cases have occurred. Special measures for the prevention of the migration of rats from ships and for their destruction on board must be carried out if ordered by the Department.

The maritime world recognises that rat life aboard ships is a menace to health and an economic burden. For this reason shipbuilders are now endeavouring to provide ships of rat-proofing design and construction. Under an international agreement of 1936 all ships must every six months obtain a deratisation certificate, or, if the examination of the ship fails to disclose the presence of rats, a deratisation exemption certificate.

With proper rat control and therefore a minimum number of rat fleas present, there is very little danger of the introduction of bubonic plague. However, it has been discovered that other animals besides the rat can act as reservoirs of plague, such as the ground squirrel of America, the marmot of Asia, and the gerbille of South Africa.

Control of Fleas

Remembering that the chief sources of fleas are:—(1) Too close proximity to stables, fowl runs, etc.; (2) want of cleanliness, particularly in allowing dust to collect; (3) allowing too indiscriminate and free access of flea carriers, such as cats, dogs, rats, mice, etc., to living-rooms, the method of preventing an infestation of these parasites is obvious.

It must be borne in mind that, unlike lice, fleas may remain active and ready to resume their normal activities when the house becomes occupied once more. If it is discovered by irritating experience that one has unexpectedly been the subject of the attention of these parasites it is wise to search one's garments while holding them over a large receptacle filled with water. Then, if it eludes capture the chances are that it will drop into the water, and then, as one author puts it, "the rest is silence."

Treating an Infected House

In treating an infected house, all domestic animals should be cleansed, rubbish removed, and all floors thoroughly washed with a solution of coal-tar disinfectant. One of the best ways of ridding an infected room of fleas is to sprinkle or scatter at least 5lb of flaked naphthalene over the floor and to keep the room tightly closed for 24 hours. Any coverings used for the floor should be thoroughly aired and beaten and then sprinkled with kerosene, pyrenthrum powder, or naphthalene.

Preparation Of Emulsion

Outbuildings should also be treated, being specially careful to remove any collections of dust and rubbish. Paraffin emulsion may also be sprayed on, and a creosote preparation will be found useful. Pure paraffin should not be used, but should always be emulsified with soft soap and hot water.

A British Museum booklet on this subject states that an emulsion which, when diluted with water (1 in 20, or even more) will kill all fleas that it touches on floors, clothing, or in the coats of animals, may be prepared from soft soap and ordinary mineral burning oil, either petroleum, kerosene, or paraffin, as follows:—Three parts of soft soap are thoroughly melted by heat in 15 parts of water and, while still hot, 70 to 100 parts of the oil are added gradually with much shaking or stirring. Note: the proper emulsification depends upon the gradual addition of the oil and thorough agitation. The final mixture should be white and creamy with no free oil.

Oil emulsions made with the light or more volatile oils are quicker in action and more penetrating than those of heavy oils. They are, however, more rapidly dispersed by drying-off and evaporation. The nature of the climate and locality must be considered.

The Fox and The Flea

An old "hunting story" says: "Many hunters know that foxes, which are proverbially full of fleas, have a clever way of getting quit of them. The fox gathers some handfuls of wool from the thorns and briars and, wrapping it up, holds it fast in its mouth; then he goes by degrees into a cold river, and dips himself down by little and little. When he finds that all the fleas have crept so high as his head for fear of drowning, and ultimately for shelter creep into the wool, he barks and spits out the wool full of fleas, and then very froliquely being delivered from their molestations, he swims to the land."

This is a little more doubtful even than the assertion that the mosquito was responsible for the origin of the highland fling, or the story told of Christine, Queen of Sweden, who is reported to have fired at the fleas that troubled her with a piece of artillery still exhibited in the Royal Arsenal at Stockholm.

Dogs and Cats

Infested dogs may be washed with a 3 per cent. solution of cresol. This mixture is not recommended for cats, which should be dusted over sheets of paper with pyrethrum powder, which stuns the fleas, causing them to fall off on to the paper.

The irritation of flea-bites may be allayed by bathing with weak ammonia or a 2 per cent. carbolic acid lotion.

In the case of a ship or building infested with rats and thus with rat fleas, special fumigation measures are employed. These, however, should never be used except under the supervision and control of a person specially trained and qualified in the method.

Domestic Hygiene

Finally, domestic hygience has, in most civilised countries, reached a high standard. For the most part, our homes are clean and sweet and healthful, yet occasionally, in spite of the greatest care, insect pests may visit us, and it is well to know how to clear them out. Sunlight, fresh air, soap and water and "elbow grease" are excellent allies. The most effective methods strike at the breeding places. Next to suppression of their breeding places, the most important measures with some insects in the household are to starve out these pests. Food must be protected.

An eminent authority has written: "Science has demonstrated the danger from insects. Experience long ago decided that a healthy home must be free of insects and vermin of all kinds. It remains for the future to extend this kind of cleanliness to municipal housekeeping and rural sanitation."

The Farm Home and Kitchen

Contributed by the Association for Country Education

The Cooks and Ploughmen Also Serve

FOR years now, it seems, our indignation and shame have been rising as we have read of the appalling suffering and degradation which have been forced upon not only political opponents and national leaders, but on the simple, plain, home-loving people in the countries which have been successively engulfed by Hitlerism.

So that when war was declared and the British Empire pledged herself to prevent this barbarity from spreading further and to force such restoration as was possible to those who had been robbed of their all, the almost universal feeling was one of approval, and our one thought was—"What can I do to help?"

With emotions stirred by the events leading up to the war, by the realisation of what was at stake now that we had entered it, and by seeing our husbands, sons, and brothers giving up their work and joining up, there came to many of us women a great impulse to "down tools" so that we, too, could throw ourselves into some war activity.

Where Duty Lies

During the first outburst of patriotic feeling we were apt to feel that we were shirking our duty if we did not find some wartime activity to support or to organise, but now that we can face the matter more calmly we must decide whether everyone's duty lies in that direction.

Can everyone best serve her country in its time of need by serving on committees and putting a lot of time and energy into organising or attending activities arising from our being at war? How we can answer this question seems to depend on whether or not what we are already doing is of sufficient national importance to demand, if not the full, at least the greater part of our time, energy, and ability.

If the work which each of us is at present doing is of national importance and we are better fitted to do it than others, and if in order to do it successfully practically all our time, thought, and energy must be devoted to it—then it seems to me that our duty is clear. For *that* is our duty, our war-work, and we must do it with all our might and main and leave the special war-time activities to those whose present work is of less national significance or who have leisure, time, and spare energy to give to it.

Essential Work

At this time farming and the keeping of the farm home stand second to none as work of national importance, so that the patriotism of many an already busy farm woman can best find its expression in making every effort to carry out better than ever the work that lies ready to her hands. She is "doing her bit" if she wastes nothing—not the family's time, health, energy, nor resources—but helps it to secure maximum returns and so increase the country's production.

When extra work is falling on the shoulders of the farm family, nothing is more valuable in keeping the farm at the peak of production than health, because every day that anyone is off colour means that his or her work is less well done, and every day that anyone spends in hospital or at home too sick to work is a day's work lost. The farmer's wife who can keep her family fit thus helps to win the war.

Next to health the farm home's most valuable asset is good management, or the use of knowledge and method, for "brains" produce far more results than "brawn" except in the most mechanical of jobs. And no one can say that farming or home-making is mechanical work. Good farming and good farm home-making result only from studying, planning, and organising so that the farm's resources of money, implements, land, animals, and man- and woman-power may be used wisely and to the best advantage.

Doing Our Best

The work of the farmer or his wife affords plenty of scope for the use of their enthusiasm and brain and muscle, and at no time more than the present have they been more urgently needed.

So I would say in conclusion that whether we are on the land or whether we have other work to do, if we would serve our country we should seriously take stock of ourselves and our work, and see whether we are honestly doing the best of which we are capable.

Then, if necessary, we must be willing to learn how to do a better job, and to submit ourselves to self-discipline and training—even as our soldiers have voluntarily given themselves to be trained and disciplined—so that we, like them, may fit ourselves for our work and proudly give to the cause the very best service that lies in our power.

—VIOLET MACMILLAN, B.H.Sc.

Raw Apples for Vitamin C

NO one should run any risk of lack of Vitamin C this winter, for never before has it been so easy for everyone to obtain and to enjoy raw foods as it is this autumn, with apples so cheap.

Rats are the only known animals which do not require plenty of Vitamin C in their diets. They seem to be able to grow and to remain healthy without it. But if man goes without it completely he gets scurvey. His limbs swell, his teeth drop out, and his bones become brittle and may fracture spontaneously. If man receives some Vitamin C, but insufficient for his needs, he is below par physically and he is susceptible to diseases germ and to fleeting pains in joints and muscles (often mistaken for rheumatism). According to recent investigations, it is probable that a prolonged shortage of Vitamin C in the system is the pre-disposing factor to such diseases as rheumatoid arthritis and hardening of the arteries.

The ill-effects of a deficiency of Vitamin C is particularly pronounced in the case of children, as it stunts and retards growth and spoils appetite, and pre-disposes to infections of the mouth and gums.

The present-day habits of eating, with their emphasis on cooked food and cereals, roots, sugar, etc., do everything possible to rob people of their Vitamin C. For Vitamin C is a part of living substances; it is found in the living food substances, and its destruction begins when the animal is killed or the vegetable or fruit is picked. Cutting, mincing, and shredding, because they increase the amount of surface exposed to the air, hasten this process of destruction, and so does cooking. Cooking with soda destroys it completely.

While in their unbroken skins fruit retain their Vitamin C to a considerable extent, but there is more Vitamin C in the skin than in the pith of the fruit, because the skin is the more active or living tissue. One can therefore see the advantages of eating apples raw and with the skin on. Just to bite into the apple or to cut it up as one eats it is the best way, but if it is necessary to cut it up for salads, then the later this is done before serving the meal the better.

So eat your apples raw as much as possible.

Here are some apple salad recipes.

WALDORF SALAD.

1½ cups diced apples, 1 cup celery, diced, 1 cup black walnuts, mayonnaise.

Method.—Combine the ingredients and use just enough mayonnaise dressing to moisten the salad. Serve on crisp lettuce. Raisins or dates cut in pieces may be substitutes for the nuts.

APPLE AND CABBAGE SALAD.

2 cups cabbage, shredded, 1 cup celery, diced, 1 cup apples, diced.

Method.—Combine the ingredients and mix lightly with sour cream dressing or mayonnaise. Serve on crisp lettuce or water cress. Red apples with tender skins may be used unpeeled, which gives an interesting variation in colour.

CINNAMON APPLE SALAD.

Select medium-sized, firm, tart apples. Pare and care. Cook in a covered pan in syrup made in the proportion of 2 cups of water and 1 cup of sugar. Use enough syrup to cover the apples. Red cinnamon candies added to the syrup give the apples an attractive rose colour. After cooking, drain the apples, chill and fill with cottage or cream cheese which has been mixed with salt, paprika, and a little finely-chopped green pepper. Or form the cheese into balls, roll in ground nuts, and place beside the apples. Serve on lettuce with mayonnaise or French dressing.

Apple Recipes

APPLE CHUTNEY.

7lb. green apples.
2lb. sultanas.
4lb. brown sugar.
1lb. preserved ginger.
1 teaspoon cayenne.
1oz. or less garlic.
1 teaspoon spice.
1 teaspoon salt.
1 quart vinegar.

Method.—The apples should be peeled and sliced and boiled with the brown sugar until fairly thick. The chopped ginger, sultanas, garlic, and spices should be added and boiled for 20 minutes. The vinegar should then be mixed in and simmered until the mixture has the requisite consistency.

APPLE AMBER.

Method.—Rub 2 cups cooked apples through a sieve, add 4 tablespoons sugar (2oz.), 1½oz. butter, and 2 tablespoons lemon juice (1 large lemon). Add this mixture to 3 beaten egg yolks. Pour into a plate lined with short pastry and bake in oven at 450deg. F. for 10 minutes to cook the rim of the pastry. Reduce heat to 325deg. F., and continue at this temperature until filling is cooked. Beat 3 egg whites till stiff, add 3 tablespoons sugar and beat again. Pile on top of sweet and decorate with cherries. Return to oven to brown. Any fruit may be used in place of apples.

APPLE BROWN BETTY.

Method.—Combine ½ to 1 cup sugar, ¼ teaspoon cinnamon, ¼ teaspoon nutmeg and 1-8 teaspoon salt (the amount of sugar depends upon the sweetness of the apples). Prepare 2 cups of stale breadcrumbs and 3 cups of sliced or chopped pared apples. In a greased baking dish put a layer of one-third of the crumbs, then half of the sliced apples. Sprinkle over half the sugar mixture. Repeat until apples are used up. Then pour 1-3 cup water, 3 tablespoons lemon juice, and 2 teaspoonfuls grated lemon rind over all. Sprinkle the top with crumbs and dot with 2 tablespoons of butter. Cover and bake in a hot oven of 400deg. F. for about 40 minutes. Uncover the last 20 minutes. Serve with top milk. Serves eight persons.

APPLE ROLL.

Method.—Measure and sift together 2 cupfuls flour, 4 teaspoons baking powder, and ½ teaspoon salt. Cut in 1-3 cup shortening until the mixture is crumb-like in consistency. Add from ½ to ¾ cup milk or sufficient to make a dough which can be easily handled. Roll this dough out to ¼in. thickness in oblong shape, and spread with 1 tablespoon melted fat. Pare and thinly slice 2 large apples and mix with 4 tablespoons sugar and ¼ teaspoon cinnamon. Spread over the dough, and roll up into a roll 15 inches long and 2 inches in diameter. Bring the ends together, and lay in a shallow round greased pan. Then, with a sharp knife or scissors, cut the roll nearly through at 1-inch intervals and spread slightly apart. Sprinkle lightly with 1-8 teaspoon cinnamon and bake in a hot oven of 400deg. F. about

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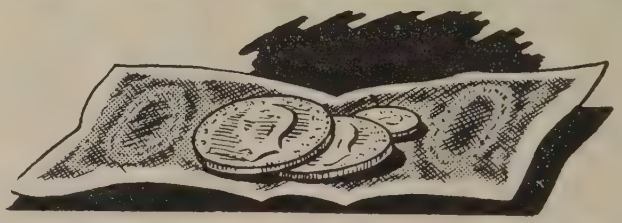

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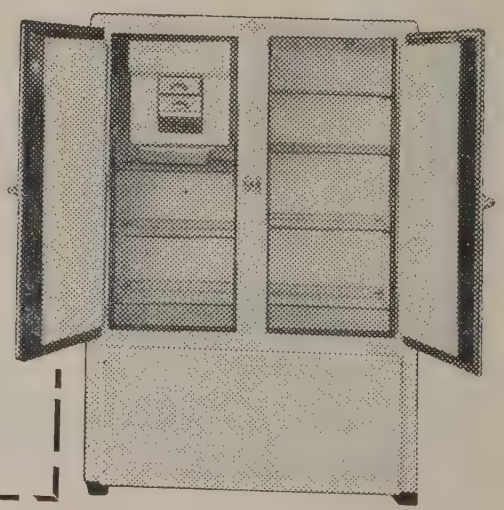

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15 minutes or until the crust is done and the apples tender. Serve with Clear Pudding Sauce.

For **Clear Pudding Sauce,** melt 4 tablespoons butter in top of a double boiler. Add 2 tablespoons flour, speck of salt and 3 tablespoons sugar, and stir until smooth. Add 1 cup of boiling water and cook until smooth—about 5 minutes. Add ½ teaspoon vanilla and serve at once. Serves eight persons. (Before baking the roll, ¾ cup of milk may be poured over. This will produce a pleasing variation to this recipe. Cook it then in a somewhat slower oven and for 10 minutes longer).

APPLE CRISP.

Method.—Grease a casserole and fill with six apples which have been pared, cored and thinly sliced. Add ½ cup water and 1 teaspoon cinnamon. Then combine ¼ cup sugar, ¾ cup flour, and 6 tablespoons butter, and work with the finger tips until crumbly. Spread over the apples and bake in a hot oven of 400deg. F. for about 30 minutes. Serves six persons.

DUTCH APPLE CAKE.

½lb. butter.
Pinch salt.
½ cup milk.
2oz. sugar.
1 teaspoon baking powder.
1½oz. butter.
¾lb. sliced apples.
1 teaspoon cinnamon.
For the **Sauce:—**
½oz. cornflour.
1 teaspoon lemon juice.
1oz. sugar.

Method.—Make a dough ½-inch thick with the flour, baking powder, salt, butter, and milk, and press the apples into the dough, sprinkle with cinnamon and sugar, and bake ¾ hour. For the sauce, boil the apple peelings with water to make 1 cup of juice, add the cornflour, sugar, and lemon and cook for a few minutes.

BAKED APPLES.

Method.—Take medium-sized baking apples, wash and core them, then cut a line round outside of skin with sharp knife. This allows apple to swell, but not burst and so lose its shape. Fill the centre of apple with:

(1) Light brown sugar and ¼ teaspoonful cinnamon or 1 clove, place ¼ to ½ teaspoonful butter on top of each.

(2) Apricot jam—any other tart jam will serve.

(3) Raisins, dates, or any other dried fruit.

Set in pan with small quantity of water. Bake at 375-400 degrees Fahrenheit, ½ to ¾ hour or until soft. Baste with liquid around apple to give glossy surface. Serve hot or cold with cream.

PEPPERMINT APPLES.

Method.—Prepare as above and bake in syrup prepared from stick peppermint candy. (Colour rose pink). These may be served with baked ham or pork.

WALDORF SALAD.

Method.—Cut a ripe apple into half-inch cubes. Cut tender celery of an equal amount into small pieces. Combine with walnut meats and salad dressing. Place on lettuce leaves and add dressing and a garnish of chopped nuts.

APPLE AND CARROT SALAD.

Method.—Cut up ripe, rather tart apples into ¼-inch cubes, and grate an equal quantity of well-scrubbed tender raw carrots. Blend the two with a good dressing, and place on lettuce leaves or a nest of finely-shredded crisp cabbage. Garnish with chopped walnuts and stoned dates cut lengthwise, and serve with extra dressing.

APPLE AND MINT JELLY.

Wash mint leaves thoroughly. Measure in cupfuls, packing solidly, and add 1 cup boiling water to each cup of mint leaves. Set on back of stove in an enamel saucepan with lid on and allow to steep for one hour. Do not boil. Strain through butter muslin and squeeze to extract all the moisture.

For apple juice sugar, scrub tart or under-ripe apples and remove damaged portions and cut up. Cover with water and boil until the pieces of apple lose their shape. Turn pulp into jelly-bag and drain without squeezing. For each cup of juice, add 1 to 2 tablespoons of mint infusion. Stir well. Test juice for pectin content by mixing equal quantities (say, one teaspoonful) of the fruit extract and of methylated spirits. If the mixture sets, forming a colourless but clotted jelly, then the extract is very rich in pectin, and an equal quantity of sugar may be added to the fruit juice, e.g., one cup of sugar to one cup of fruit juice. If it goes cloudy and thickens a little but does not jell, use three-quarters cup sugar to one cup of fruit juice. If it goes cloudy and does not thicken at all, then there is very little pectin present, and half a cup of sugar to one cup of fruit juice is the best proportion to use. Measure the juice into a large preserving pan and boil quickly for 10 minutes, then add sugar (according to pectin test) and boil quickly until sheet test is given. This should be in about 5 minutes. Tint with green colouring and pour into sterilised jars. Seal with paraffin wax and cover.

LEMON SYRUP.

Juice and grated rind of 6 lemons.
4½ lbs. sugar.
1 oz. citric acid.
2 oz. tartaric acid.
2 packets Epsom salts.
8 cups boiling water.

Method.—Stir till sugar is dissolved. Bottle when cold.

JELLIED VEGETABLES.

2¼ tablespoons gelatin.
¼ cup cold water.
1 cup boiling water.
3 tablespoons vinegar.
3 tablespoons lemon juice.
¼ cup sugar.
1 teaspoon salt.
1 cup celery.
1 cup cabbage.
1 cup cooked peas.
Or any other vegetables.

Method.—Soak gelatin in cold water 10 minutes. Dissolve in boiling water. Add vinegar, lemon juice, sugar, salt. Stir in vegetables and mix thoroughly. Turn into mould, dipped in cold water.

CARDINAL SALAD.

1 packet lemon jelly crystals.
1 cup boiling water.
2/3 cup beet juice.
3 tablespoons vinegar.
1 tablespoon horseradish.
2 teaspoons grated onion.
½ teaspoon salt.
1 cup diced beets.
¾ cup diced celery.

Method.—Make like an ordinary jelly.

BUTTERMILK CAKE.

2 lb. flour.
1 lb. brown sugar.
1 oz. baking soda.
¾ lb. butter.
2 lb. mixed fruit.
1 teaspoon mixed spice.
1 pint sour buttermilk.

Method.—Make as any butter cake. Bake 1½ hours.

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